December 8, 1947

STEEL

The Magazine of Metalworking and Metalproducing

TECHNOLOGY DEPARTMENT ESTABLISHED 1882 EDITORIAL INDEX, PAGE 53

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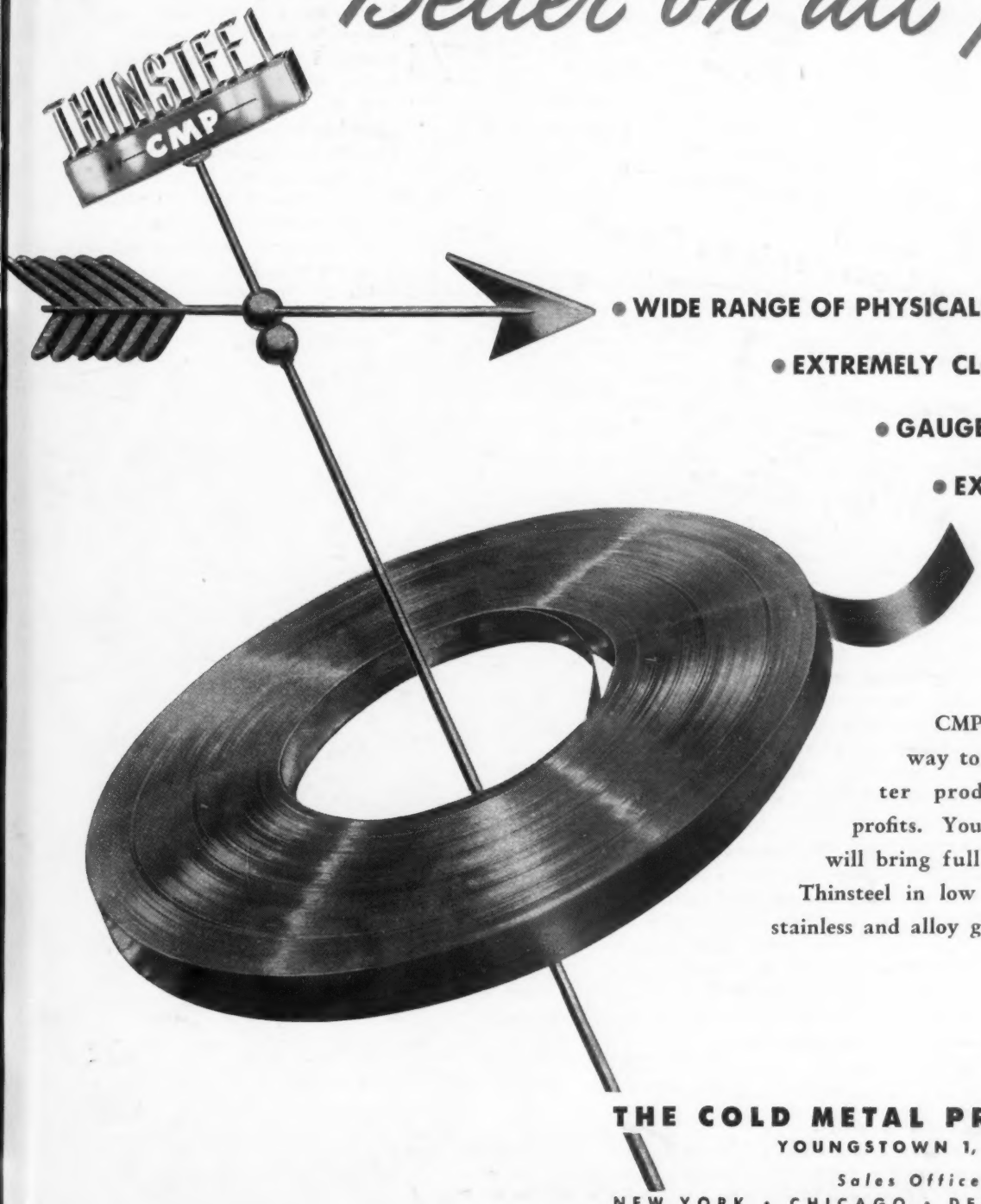
Better on all points



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THE COLD METAL PRODUCTS CO.
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DUAL CONTROL for CRANES by E&M

1. CAB CONTROL
When Operator is on Duty

2. FLOOR CONTROL
When Operator is off Duty
. . for Lunch Periods or Night Shifts

EC&M builds a complete line of control, brakes, and limit stops engineered to the needs of each application. Cab-controlled cranes usually have fast bridge speeds for high production, with floor-controlled bridge speeds limited to accommodate the man walking with the load. In this new combination floor and cab type, the bridge running speed is maximum when the crane is operated from the cab, and is automatically reduced when controlled from the push button station at floor level. Put your crane control requirements up to EC&M for efficient operation at low up-keep expense.

This new *combination* system of control saves time, delays, or demurrage whenever the operator has climbed down from the cab and occasional lifts become necessary. The crane can then be operated at floor level, from the pendant push button station, to handle incoming or outgoing shipments arriving during *noon-hours*, after the *end of a working day*, or during the *night shift*.

This control is especially well suited to cranes in warehouse service. It is equally advantageous for certain foundry or machine-shop operations where floor-control eliminates the necessity of climbing up into the cab to handle the occasional piece. This EC&M dual crane control, permitting operation from either cab or floor, is available for both alternating and direct current cranes of all capacities and makes. Our nearby office will be glad to discuss your requirements and furnish complete details.

THE ELECTRIC CONTROLLER AND MANUFACTURING CO.
2698 East 79th Street Cleveland 4, Ohio

are you making any of these of stainless ?

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- Cutlery
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- Retorts
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- Surgical and dental instruments
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- Tie rods
- Turbine blades
- Valve parts

There's no doubt about the increasing demand for stainless steel parts. Your use of top-quality stainless bars can be assured by selection of the proper grade from the complete line of Bethalon (free-machining) and Bethadur stainless steels. Bethlehem metallurgists stand ready at all times to work with you in the planning and production of stainless steel products.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by
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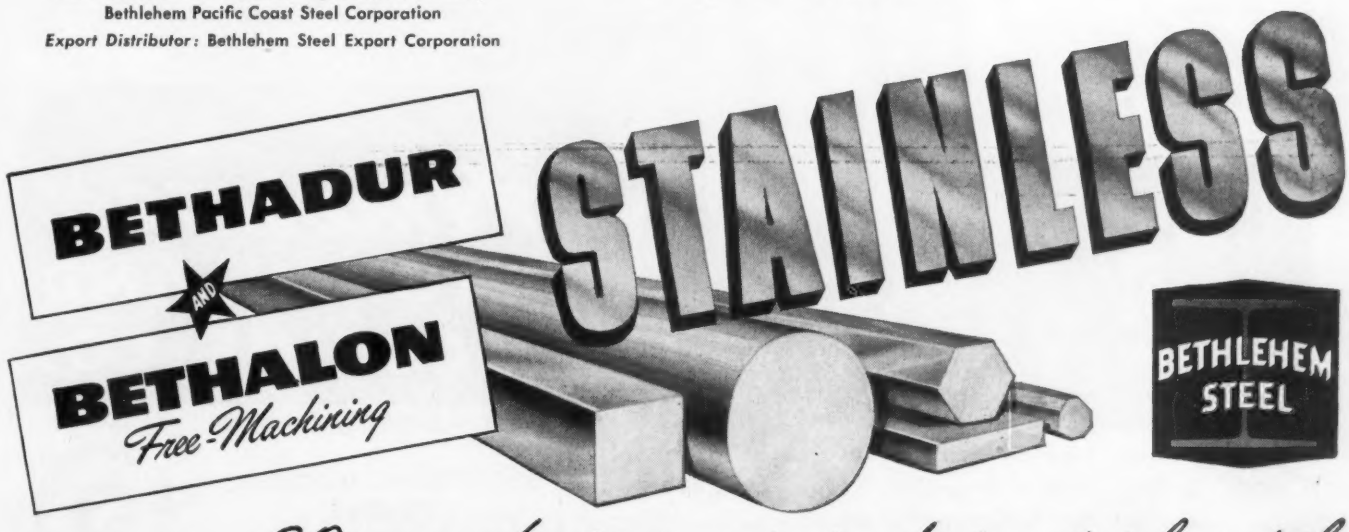
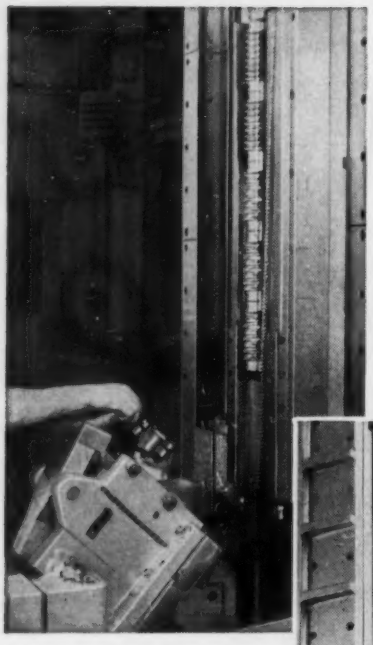


30 years of experience in producing stainless steels

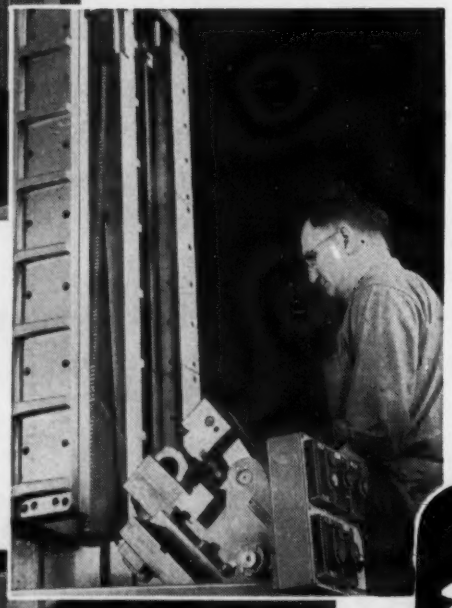
BEARING CAP SETS BROACHED EN BLOC

This *American* Duplex Surface Broaching Machine is tooled up to broach automotive main bearing caps, producing complete sets for 100 motors per hour.

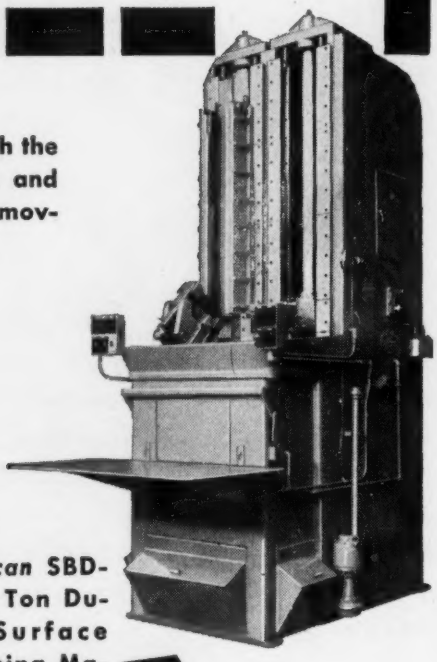
When you are planning metal shaping or finishing work, make use of *American's* complete broaching service—machines, tools, and engineering. You are under no obligation when you SEE *American* FIRST!



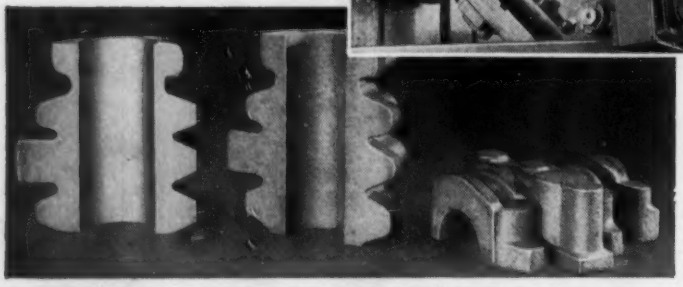
Operation at the left is to finish the joint face and bearing lock and semi-finish the half round, removing ⅛ stock on each surface.



Operation at right straddle broaches the two ends of the casting.



***American* SBD-66-25 Ton Duplex Surface Broaching Machine with tilting type work tables.**



Above: Right to left: 1. The rough casting. 2. Ends straddle broached. 3. Joint face, bearing lock and half round broached.

FOR ALL YOUR BROACHING NEEDS—
SEE AMERICAN FIRST

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BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

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BROACHING MACHINES
PRESSES
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DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

Dressed to sell

Better electric motors
through
JACK & HEINTZ
Mass Precision

Every day, thousands of J & H electric motors step out into industry—smooth-lined and shiny—*dressed to sell.* Tops in appearance and performance, and backed by the world-wide reputation of Jack & Heintz for precision workmanship, these J & H motors enhance the sales appeal of the appliances and machines they power. Their features are described in Bul. SF-3200, free on request.

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

For the Future

Looming up on the near-horizon is our annual yearbook number, which we have mentioned before in this column. The editorial staff is hard at work on that one, and we needn't say more than that it will be up to the standards established by previous yearbook issues. Beyond that, we have another little item we want to mention briefly here. One of last year's surprises was the first materials handling show. We were there, in force, and like all other people who attended we were extremely happy about the whole deal. Attendance was good, exhibits were interesting, and all in all it was one of the best industrial shows we've seen. It's being repeated in January, and we will be there with an exhibit. In addition, we will have a special editorial effort devoted to the show in our January 12 issue. Better mark that one down on your calendar, and if you're planning to be anywhere near Cleveland during that week, by all means plan to spend a little time at the show.

On Geography, and Stuff

For the especial benefit of Reid Kenyon of Armco and other readers whose geography of the world was learned in a past era, we didn't really discover a new country on page 54 of our November 24 issue. That list of countries in the article on the new lower tariffs contained one "Benelux". Benelux has really been in existence for centuries, and is only a contraction of the names of the three countries which have a joint customs union — Belgium, Netherlands and Luxembourg. Having explained that little item, we can now establish our claim to the title of expert on geography. Of course, all we had to do was read the article with which that table was published, because STEEL'S editors, in doing their usual complete job of interpreting important news developments affecting the industry, had explained all. And while we're on the subject, have you noticed how many of these complicated subjects have been summarized by our news staff recently? The tariff story was a good example of how our boys have boiled down a few million words of legal and diplomatic documents into a concise, clear statement of what's important. Other recent jobs have included the Krug report, the Harriman report and the Taft-Hartley law—all presented so you readers can catch the essential facts and their significance in a hurry. It's another step in STEEL'S program to save time for busy metalworking executives and keep them informed on things they should know in the current scene, both here in the United States and around the globe.

Watch For These

We seem to be spouting practically 100% this week about the editorial features of the book, present, past and pending, so we might as well go the whole way and commend for your attention a couple of features in next week's issue which are keeping the people talking around here. They are the excellent study of the pig iron situation, which should be must reading for anyone operating a foundry, and the three new summary pages, which you'll find very helpful in checking the contents of each of our three sections—news, engineering and markets. They'll be a regular service to you readers, in every issue after this week, so keep your eyes peeled. If you'd like to drop us a note and let us know how you like them, we'd appreciate it, no end.

Let's Think About Zinc

Our book department would like to have us tell all you readers who are interested in galvanizing operations that the new, enlarged and revised second edition of Commander Spowers' "Hot Dip Galvanizing Practice" is off the press, and now awaiting your orders. Six bucks couldn't be spent in better fashion by anyone interested in this particular subject, so drop us a line and we'll see to it that your copy is shipped out immediate (pronounced immeeejit).

New Face, New Look

If you've been wondering about the change in appearances of our news pages, blame it on our art staff, which has been freshening up the scene with new type for headlines. We think it looks real smart, ourselves.

Shrdlu

(Editorial Index—page 53)

STEEL

Vol. 121—No. 23 December 8, 1947

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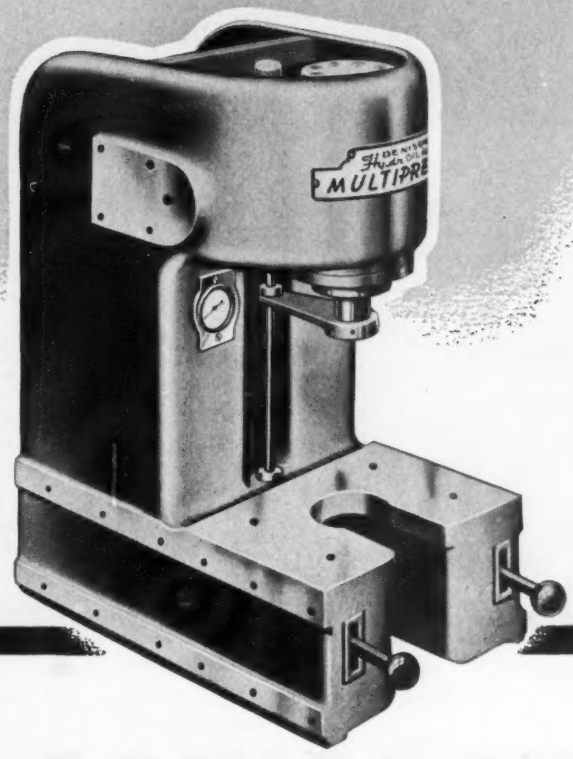
MULTIPRESS *Versatility* will boost your production



RAPID CHANGES from one operation to another with a minimum loss of operating time—you'll find this an important feature of Multipress adaptability. Using a special die-adapter on the Multipress ram, die change time can be reduced to *as little as five minutes!* Your production is never slowed up by prolonged "down time." From one high-speed job to another, Multipress flexibility makes retooling quick and easy.

Bench-size models in 4, 6 and 8 ton capacities, plus the new 75-ton floor model, offer a wide choice of manual and automatic controls of tonnage, speed and cycling—adaptable to almost any type of production job. Standard Multipress accessories include benches, side shelves, work-table extensions and a variety of bolster plates—plus accessory tooling for indexing, pelleting, foil-marking and other special operations.

Our new, colorful 28-page booklet, "Multipress, and How You Can Use It," is packed with on-the-job data and stories of Multipress accomplishments. It proves why many users call Multipress the modern production miracle.

The DENISON Engineering Co., 1163 Dublin Road, Columbus 16, Ohio

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DENISON EQUIPMENT *in* APPLIED **HydrOILics**

HydrOILics INDUSTRY'S RIGHT HAND

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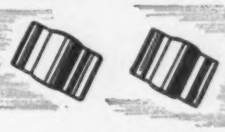
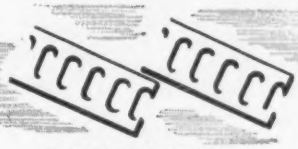
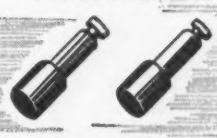


FORMING

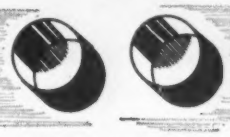
STRAIGHTENING



PUNCHING



CRIMPING



DRAWING

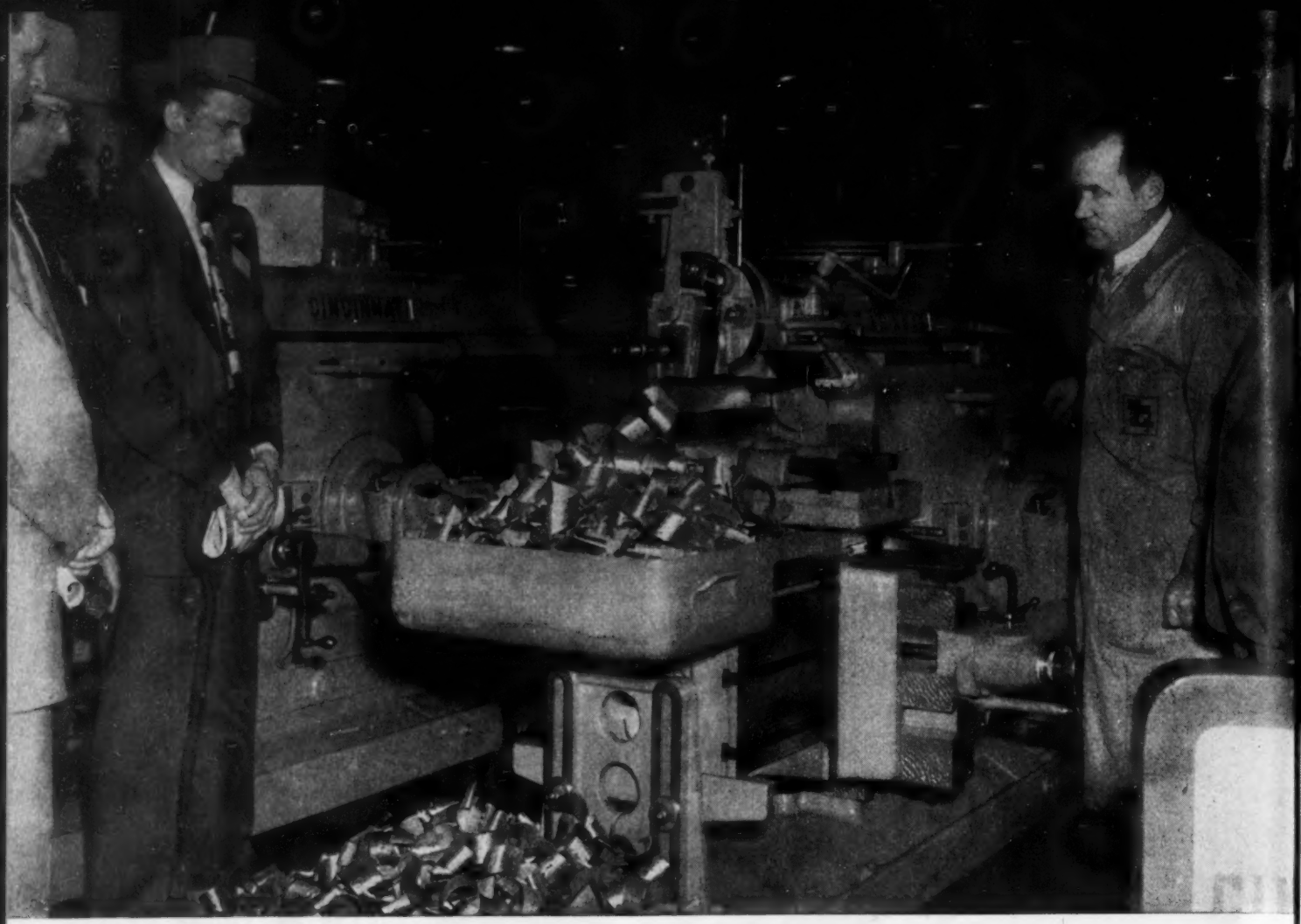
TRIMMING

PREFORMING

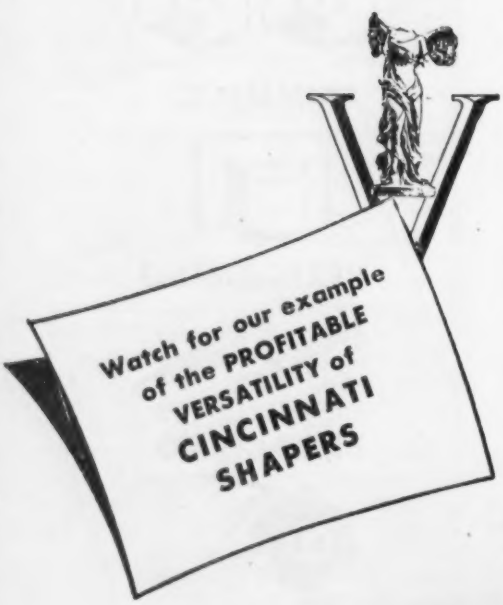
BROACHING

FOIL-MARKING

PELLETING



* A Hogging Demonstration.



HOGGING!

No shaper hogs off metal without power at the cutting tool or without rigidity or without an overall ability to stand the gaff.

Cincinnati Heavy Duty Shapers, outstanding for many years in power, stamina and sustained performance, are today more powerful and more rigid than before.

The reliable performance of Cincinnati Heavy Duty Shapers means profit in the shop.

Write for catalog N-3 on the complete line of Cincinnati Shapers.

*This Cincinnati Heavy Duty Shaper operated for the 10 days of the Machine Tool Show on a 2" depth of cut, .030" feed, and nine strokes per minute—in 1020 Steel to show the remarkable cutting capacity and rigidity of Cincinnati Shapers.

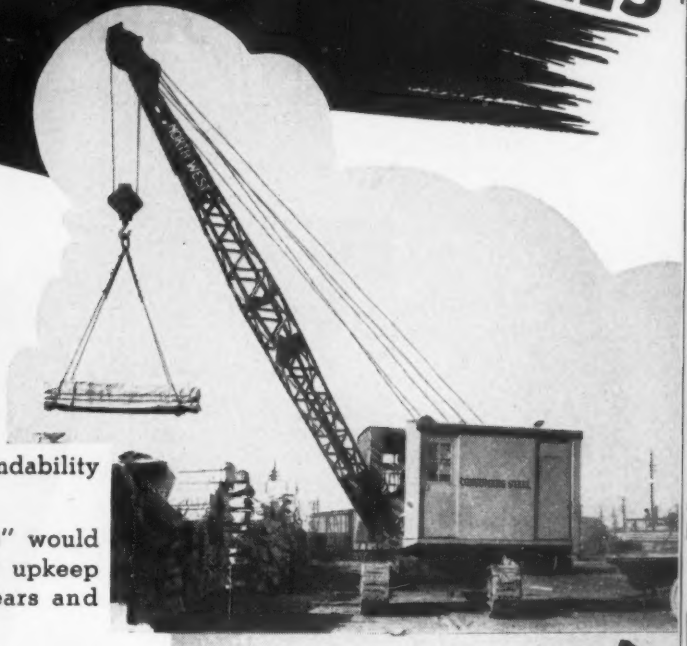
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

for smoothing THE FLOW OF MATERIALS

—YOU CAN'T BEAT A NORTHWEST CRAWLER CRANE!



Northwests long ago proved that they brought truck dependability to storeyard work.

Down time in the yard with the plant going "great guns" would be serious business. Northwest Simplicity of Design makes upkeep easy. Compare it with other machines. Note how few gears and shafts there are.

The "Feather-Touch" Clutch Control makes operation easy and speeds up output without the complications of pumps, cylinders, high pressure lines and temperature troubles — Your Northwest can't be shut down because of control failures.

The Northwest Crawler goes anywhere and Northwest steering assures smooth travel in aisles, over rails and along ties when handling cars.

Add to this the fact that a Northwest Crawler Crane will give you a full 180° coverage, materially increasing the storage area and facilitating handling. These features combine to assure smoother, continuous plant operation.

It costs you no more to plan ahead for better equipment. We would like to tell you what a Northwest can do for you.

NORTHWEST
ENGINEERING COMPANY
1508 Field Building
135 South LaSalle St., Chicago 3, Ill.

4 to 44 tons

NORTHWEST

The Crane that goes Anywhere!

graphitar
(CARBON-GRAPHITE)

problem in rotary pressure

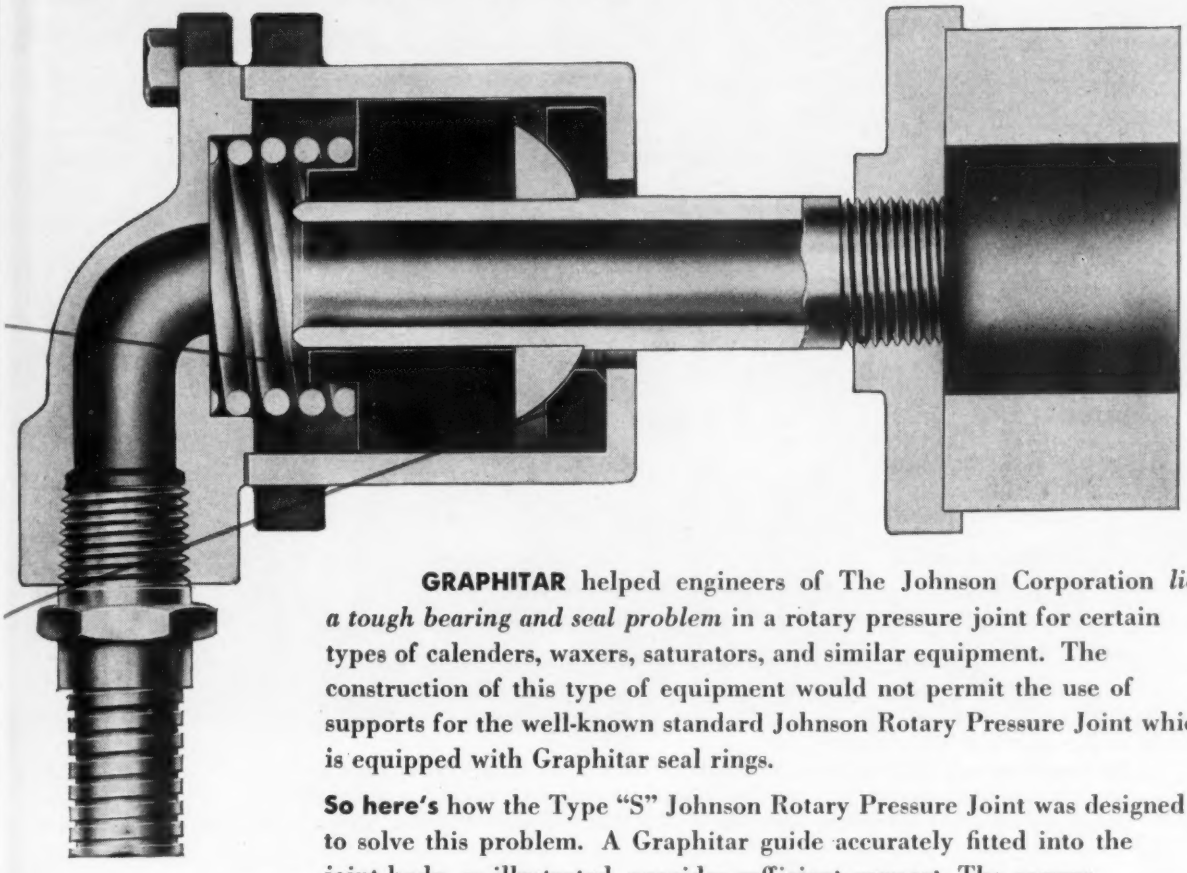
the Johnson Corporation uses Graphitar

GRAPHITAR may hold the answer to one of your design problems. It is mechanically strong, chemically inert, and highly resistant to wear. It is virtually unaffected by temperature extremes, it's self-lubricating, and extremely light weight. We can mold Graphitar in *a variety of shapes and sizes and finish it to tolerances as close as .0005" in small sizes.* Send us sketches or prints of your products and our engineers may show you where Graphitar will improve mechanical performance and save you money. **Write today for your copy of the 44 page Graphitar Catalog.**

THE UNITED STATES GRAPHITE

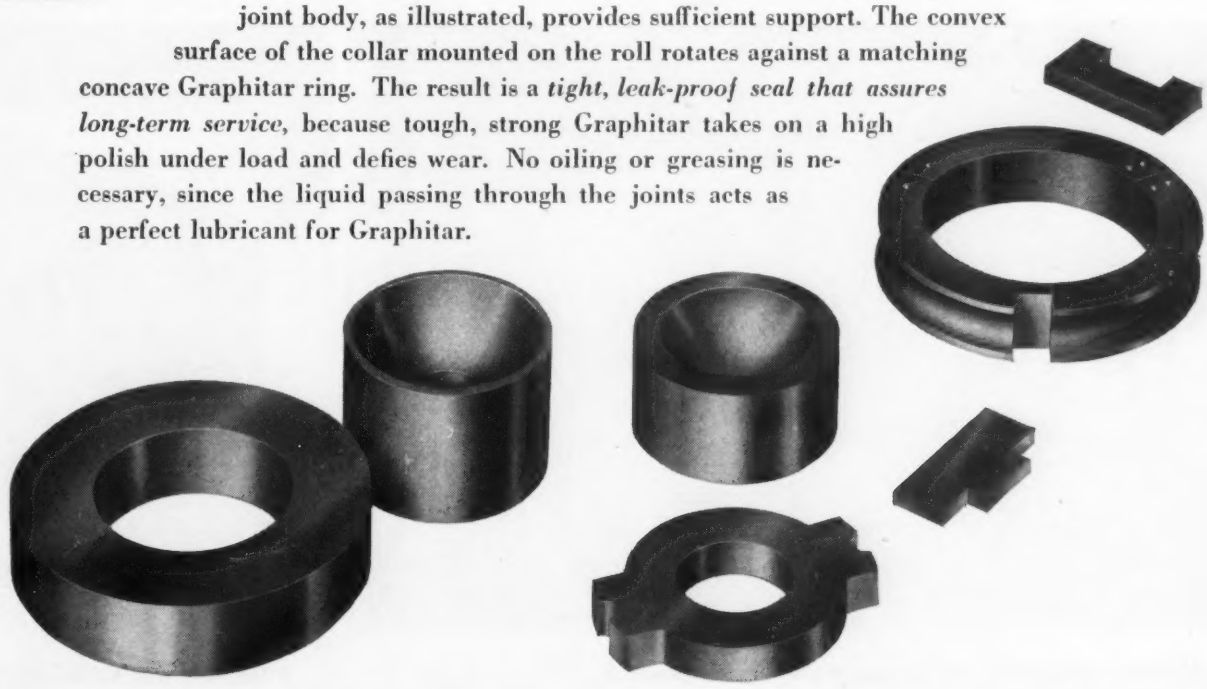
provides answer to design joint

Guide and Seal in Type "S" joint



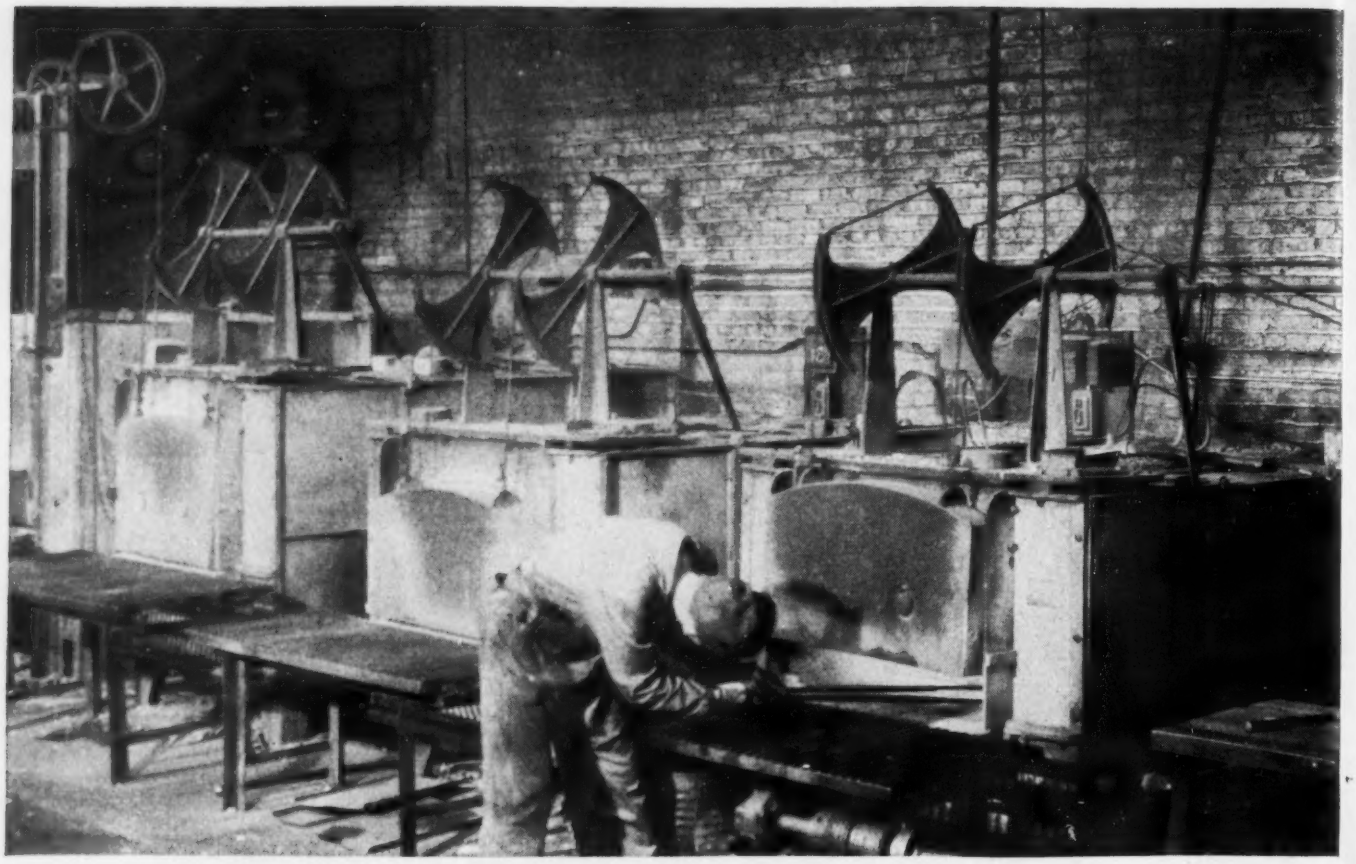
GRAPHITAR helped engineers of The Johnson Corporation *lick a tough bearing and seal problem* in a rotary pressure joint for certain types of calenders, waxers, saturators, and similar equipment. The construction of this type of equipment would not permit the use of supports for the well-known standard Johnson Rotary Pressure Joint which is equipped with Graphitar seal rings.

So here's how the Type "S" Johnson Rotary Pressure Joint was designed to solve this problem. A Graphitar guide accurately fitted into the joint body, as illustrated, provides sufficient support. The convex surface of the collar mounted on the roll rotates against a matching concave Graphitar ring. The result is a *tight, leak-proof seal that assures long-term service,* because tough, strong Graphitar takes on a high polish under load and defies wear. No oiling or greasing is necessary, since the liquid passing through the joints acts as a perfect lubricant for Graphitar.



COMPANY • SAGINAW, MICHIGAN

CARBOFRAX Hearth Tile



Because they provided greater production—lower fuel costs—fewer rejects—continuous extended service and cut repair and maintenance bills to a minimum, this large commercial heat treater installed CARBOFRAX hearths in all of his furnaces.

CARBOFRAX hearths extended service life 4 times—speeded furnace response—increased capacity and production—cut fuel and repair bills—minimized rejects.

After installing CARBOFRAX tile, production increased fourfold—oil consumption was cut—uniform

Get Credit for More Production at Less Cost

In a large number and variety of heating furnace installation, CARBOFRAX silicon carbide hearths are pointed to as the reason for increased furnace efficiency. Reports speak of better work being produced faster at less cost. CARBOFRAX tile have a thermal conductivity 11 to 12 times that of fireclay. They resist mechanical and flame abrasion, cracking and spalling. They stay level under the weight of heavy loads at high temperatures.

This combination permits the use of thinner tile. It assures rapid uniform heat flow to the working chamber. It means more efficient use of heat with lower fuel costs and fewer rejects. It provides extended service under toughest conditions with minimum maintenance and repair.

For more detailed information, write Dept. J-127. Our engineers will be glad to discuss specific problems. The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

BY **CARBORUNDUM**
TRADE MARK

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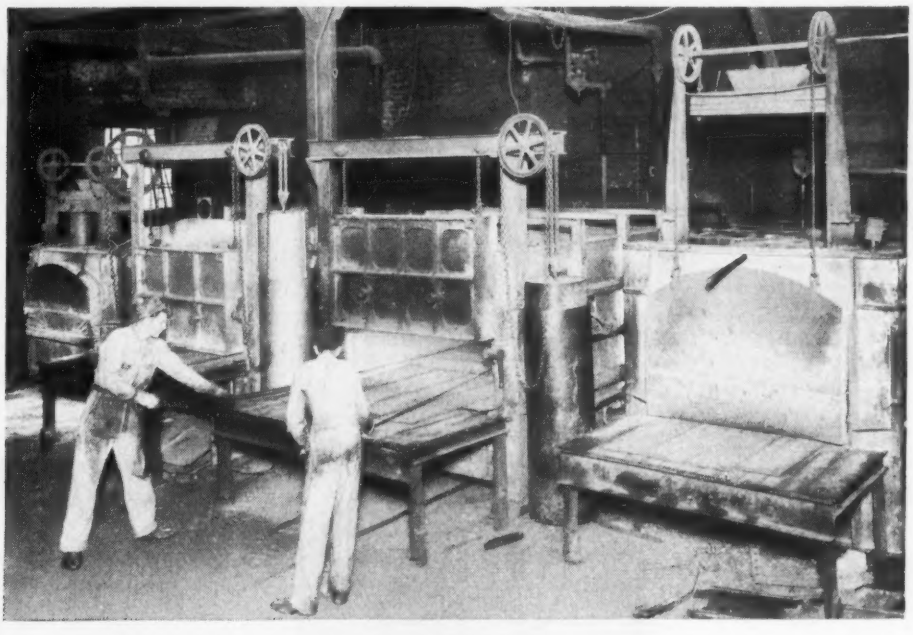
working temperatures are maintained—service was lengthened 3½ times under severe conditions.



Furnace outages for repairs cut way down as CARBOFRAX hearths help to more than triple production while saving time and money.

THE *NEW* ARITHMETIC IN STEEL

SUBTRACT— ¼ OF THE STEEL PER PRODUCT—

ADD— ⅓ MORE PRODUCTS PER TON

3 TONS OF N-A-X HIGH-TENSILE WILL DO THE WORK OF 4 TONS OF CARBON SHEET STEEL— WITH NO SACRIFICE IN PRODUCT STRENGTH

N-A-X HIGH-TENSILE is now making possible the production of more and better products per ton of steel in many plants.

It is a common experience to find that sections can be made as much as 25% lighter—with no loss of strength, and with an increase in durability. That is because N-A-X HIGH-TENSILE is so much stronger and tougher, so much more resistant to fatigue and corrosion, than ordinary carbon sheet steel. The difference between the two is so marked that three tons of N-A-X HIGH-TENSILE will ordinarily do the work of four tons of the other.

Yet with all its strength, N-A-X HIGH-TENSILE has excellent formability. It can be cold-formed and deep-drawn to produce intricate parts; and it has good weldability. These superior qualities bring you not only a better product—but also important economies in handling, fabricating and finishing.

The many advantages of N-A-X HIGH-TENSILE have created a demand that is in excess of the current supply. However, our engineers will be glad to discuss your specific problems with you against the day when this superior steel is available to all.

MAKE A TON OF SHEET STEEL GO FARTHER

Specify—

N-A-X

HIGH-TENSILE STEEL

GREAT LAKES STEEL

Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

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GREAT LAKES STEEL CORPORATION

IN THOUSANDS OF PLANTS WHERE PRODUCTION COSTS ARE OF VITAL IMPORTANCE

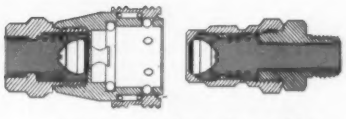
OXYGEN COUPLING

ACETYLENE COUPLING

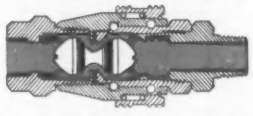
AIR, OIL, GREASE COUPLING

HANSEN
COUPLINGS GET RESULTS

The Hansen Two-Way, Shut-Off Coupling.



Red section shows how rubber washer in valve stem contacts valve seat in both plug and socket, sealing both plug and socket against leakage instantly.



Red section shows flow of liquid or gas around spool section of valve, permitting free flow of liquid or gas through coupling instantly upon connection.

When you use Hansen couplings, connections and change-overs become a matter of seconds — with no hold-up of costly operations. ♦ ♦ ♦ To connect a Hansen coupling on air, oil, or grease lines, you merely push plug into socket—flow is immediate and completely automatic. To disconnect, slide sleeve back with thumb, plug pops out and supply line is effectively sealed with no leaks or losses. ♦ ♦ ♦ It's the minutes saved on operations repeated over and over that add up to substantial savings. There's a Hansen coupling for every purpose or pressure requirement—for air, oil, or grease—for oxygen—for acetylene—also the new Hansen two-way shut-off coupling which completely seals both ends of line when disconnected.

Write for Industrial Catalog

THE HANSEN MANUFACTURING CO.

4031 WEST 150th STREET • CLEVELAND 11, OHIO

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New England States:
A. D. GEIGER, Belmont, Mass.

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B-R ENGRG. CO., Baltimore, Md.

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FOR LASTING PAINT ADHERENCE

on a zinc-coated steel sheet

. . . you can't beat Republic Electro Paintlok

It's the difficult paint-on-sheet-metal jobs that demonstrate the paint adherence of Republic ELECTRO PAINTLOK to best advantage. This "air-conditioned" vegetable stand is a good example. The painted steel frames which hold the vegetables—and which must resist rough use and moisture—are ELECTRO PAINTLOK.

This chemically-treated, zinc-coated sheet takes and *HOLDS* paint, lacquer and enamel without expensive pre-paint cleaning and preparation, because it was developed specifically for this use. It comes to you clean and in prime condition for painting—and it does not rust in storage.

Another important advantage is the tightness of the zinc coating. It will take as much fabrication strain as the base metal can stand—without cracking, peeling, flaking or powdering. And it protects against underfilm corrosion if the paint film is damaged in service.

Right now, Republic ELECTRO ZINC PLATED SHEETS are helping to improve quality and to cut costs for practically all types of painted sheet steel items. Write us, and we'll be glad to talk about your product.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic Electro Zinc Plated Products include ELECTRO PAINTLOK and ELECTRO ZINCBOND in sheets and coiled strip, in various widths depending on gauge involved.

Republic

REPUBLIC STEEL

ELECTRO ZINC PLATED SHEETS

Electro Paintlok · Electro Zincbond

Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

. . . and covers them BETTER!

YES, Cimcool covers 85% of all metal working operations—replaces all water emulsions and all but a few highly compounded specialty oils. But that's only half of the story. Cimcool actually does a *better* job—reduces costs—improves results—because it's an entirely *new kind* of cutting fluid. It's a *chemical emulsion,* incorporating an entirely new principle in cutting fluids—combining friction reduction and cooling capacity in a degree never before attained. Plant after plant knows these statements are facts, not claims. Give it a test and see for yourself!

Here's HOW Cimcool does it better!

- Cimcool cools faster—allows faster cutting.
- Uniform work temperature increases accuracy.
- Chemical lubricity increases tool life.
- No fire hazard—no smoke—no slippery film.
- Non-irritating—not subject to rancidity.
- Contains a long lasting rust inhibitor.

CIMCOOL

THE MULTI-PURPOSE CUTTING FLUID

Trade Mark Reg. U. S. Pat. Off.

CIMCOOL DIVISION of THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U. S. A.

This 25-ton diesel electric Plymouth Locomotive, in service at The Nashville Corporation, an associated company of Avco Manufacturing Corporation, Nashville, Tennessee, now handles all of the yard switching formerly done by outside railroad companies.

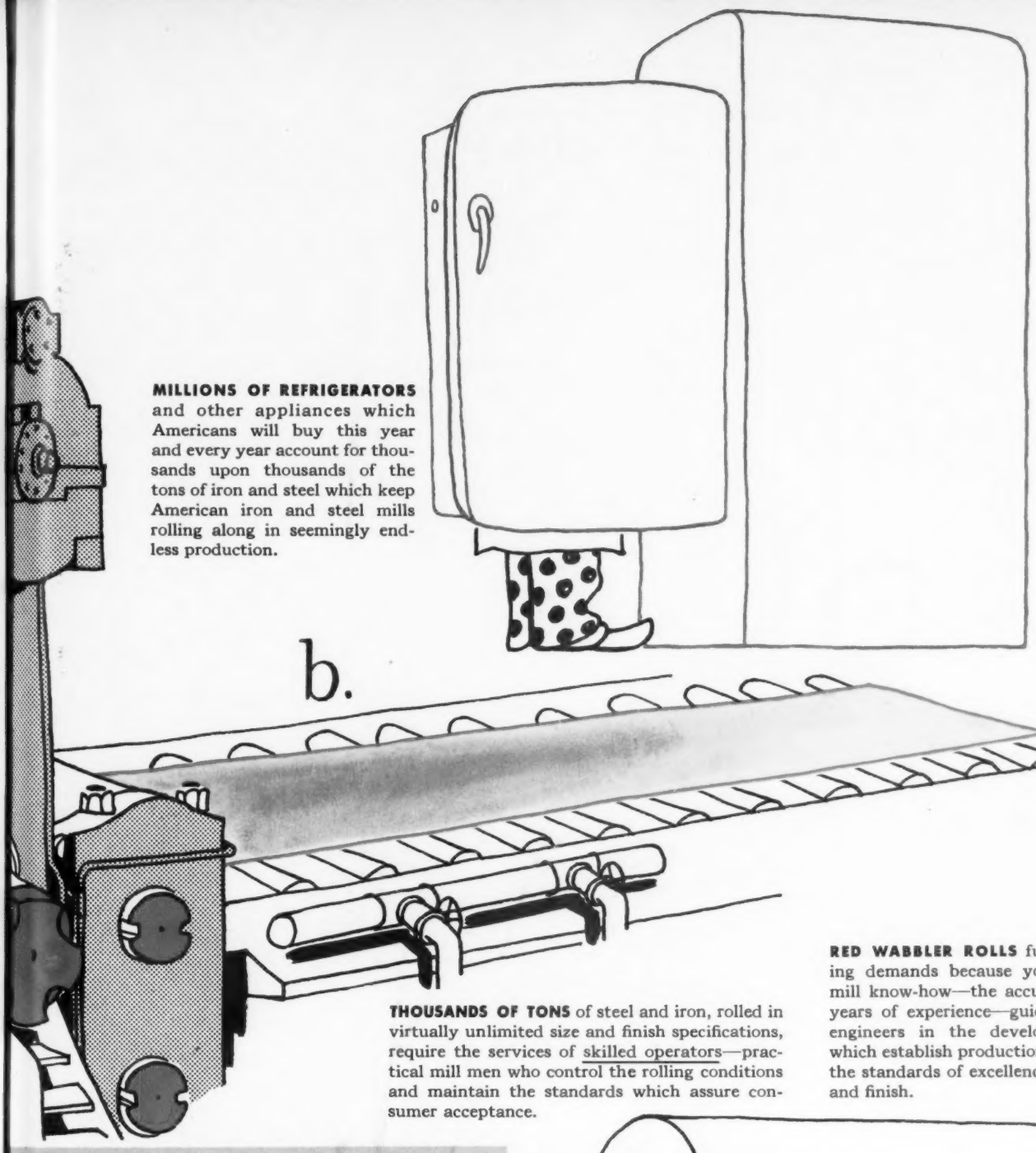
Up to 12 loaded 50 ton cars are handled within the plant yard at one time, sometimes up a maximum grade of 0.3%. As Nashville reports: "Our Plymouth is doing a satisfactory job up to the tonnage it is designed to handle." Dependable, low-cost intraplant haulage and yard switching of bigger loads . . . that's Plymouth performance, the answer to your industrial transportation problem.

If it can be moved, big or small, Plymouth will do it for you—dependably and economically. Details are available; write today outlining your handling or transportation requirements. Plymouth Locomotive Works, Dept. A-1, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co. • Plymouth, Ohio, U.S.A.



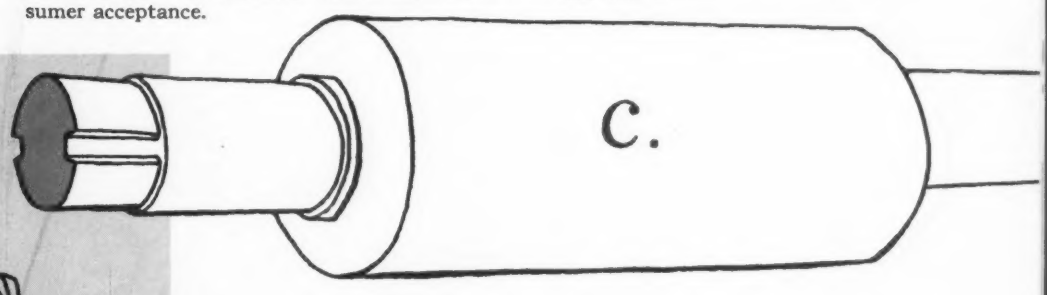
MILLIONS OF REFRIGERATORS and other appliances which Americans will buy this year and every year account for thousands upon thousands of the tons of iron and steel which keep American iron and steel mills rolling along in seemingly endless production.

a.

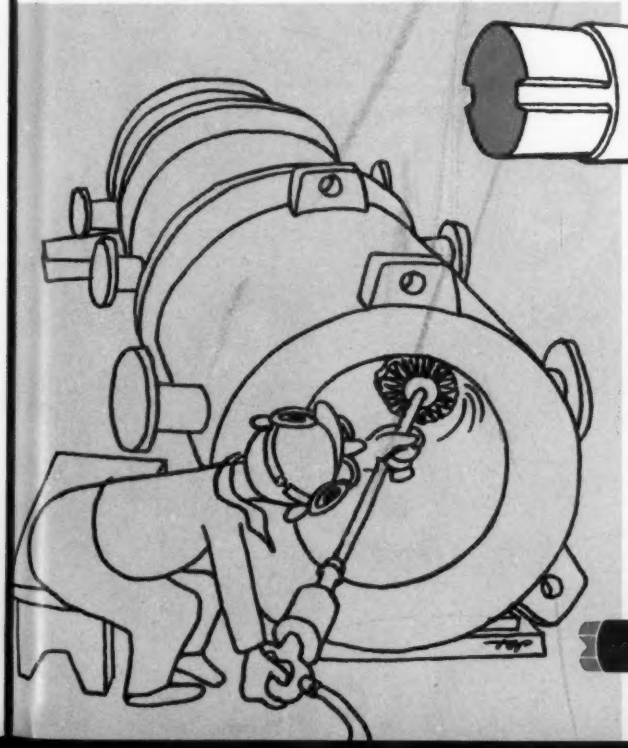
b.

THOUSANDS OF TONS of steel and iron, rolled in virtually unlimited size and finish specifications, require the services of skilled operators—practical mill men who control the rolling conditions and maintain the standards which assure consumer acceptance.

RED WABBLER ROLLS fulfill your exacting demands because your own rolling-mill know-how—the accumulated skill of years of experience—guides Mack-Hemp engineers in the development of rolls which establish production records and set the standards of excellence for uniformity and finish.



c.



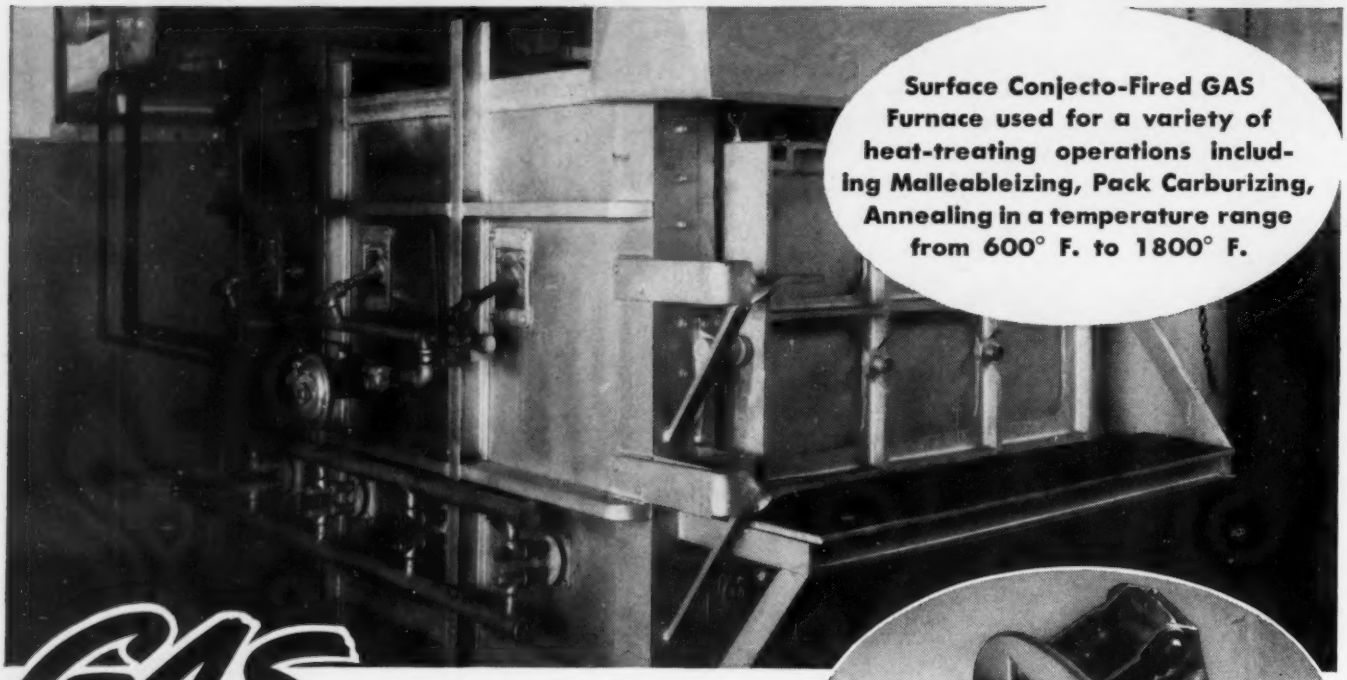
d.

MACK-HEMP CRAFTSMEN and mill-wise M-H engineers continue to combine their skills to supplement your know-how in the design, metallurgy and manufacture of Red Wabbler Rolls—the proper rolls for your production rolling operations.

MACKINTOSH-HEMPHILL CO.

PITTSBURGH AND MIDLAND, PA.

Makers of the rolls with the red wabblers



Surface Conjecto-Fired GAS Furnace used for a variety of heat-treating operations including Malleableizing, Pack Carburizing, Annealing in a temperature range from 600° F. to 1800° F.

GAS FURNACE PERFORMS MULTIPLE HEAT-TREATING FUNCTIONS UNDER VARIED CONDITIONS

In modern heat-treating, adaptability of equipment and flexibility of fuel are primary influences in any cost-per-piece analysis. As a typical example of the flexibility of the productive flames of GAS, this Conjecto-Fired GAS Furnace is used for a variety of operations without any change other than regulation of the fuel-mix and temperature controls.

Atwood Vacuum Machine Company, Rockford, Illinois, is equipped to heat-treat pieces ranging from 1 ounce to 1000 pounds, in volume up to 15,000 pounds daily. Their modern Gas-fired Equipment is adapted for annealing, carburizing, drawing, hardening, normalizing, malleableizing, stress relieving, under rigid metallurgical specifications.

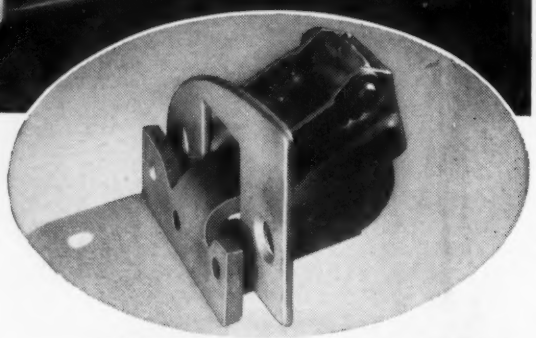
Experienced heat-treating specialists like Atwood Vacuum Machine Company use GAS because this flexible, controllable, rapid-heating fuel is so readily adaptable to all types of processing at any required temperature. If you haven't investigated modern heat-treating with GAS it's time to call your local Gas Company.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE • NEW YORK 17, NEW YORK

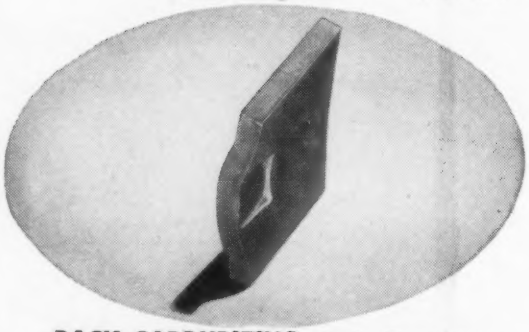
Data and Photos by SURFACE COMBUSTION CORPORATION, Toledo, Ohio, Manufacturers of Gas Heat-Treating equipment

MORE AND MORE... THE TREND IS TO GAS FOR ALL INDUSTRIAL HEATING



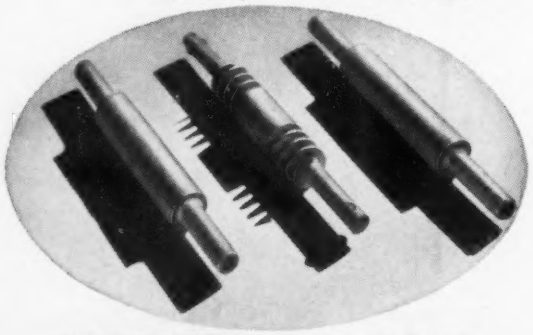
***ANNEALING*—Station wagon body hinge**

Material:	SAE 1020
Temperature:	1600° F.
Time Cycle:	36 hours
Net charge:	6400 lbs.



***PACK CARBURIZING*—Brake Trunnions**

Material:	Hot rolled SAE 1010
Temperature:	1650° F.
Time Cycle:	8 hours
Case:	.040
Net charge:	1500 lbs.



***MALLEABLEIZING*—Trailer Jack Screws**

Material:	Malleable Iron
Temperature:	1750° F.
Time Cycle:	72 hours
Net charge:	10,000 lbs.

BALDWIN

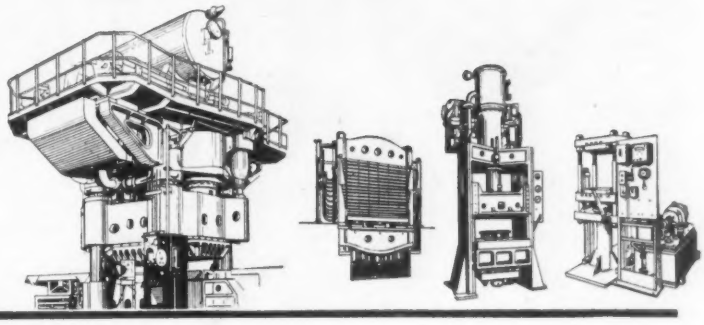
SOUTHWARK

HYDRAULIC PRESSES

a product of old experience and young ideas

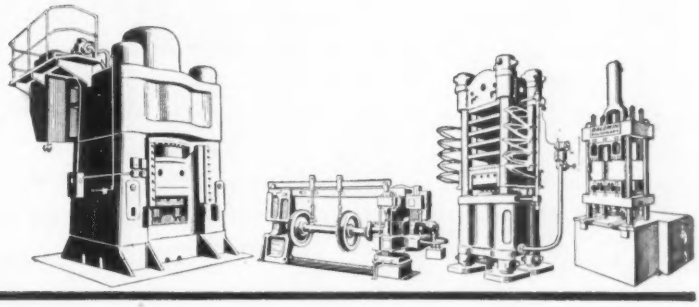
EVERY SIZE

Whether you want to form 20-gage sheets or put a crimp in steel plate 8 inches thick, there's a Baldwin press to do it. Capacities from 30 tons up to 10,000 tons—and if you want something larger or smaller, Baldwin experience can design and build it for you.



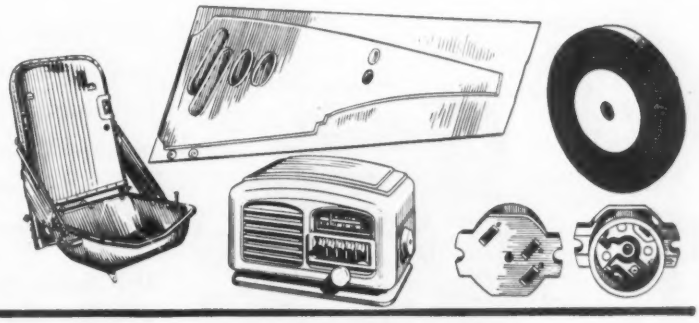
EVERY TYPE

You'll find every variety of press in the Baldwin Line, with all combinations of advanced "custom-built" features and equipment. Single, double or triple action; die cushions; strippers; manual, semi-automatic or automatic control; conveyors and loaders. You furnish the problem—we furnish the press.



FOR EVERY JOB

There's a Baldwin Press to handle every normal operation . . . forming, straightening, baling, forging, banding, assembling, die spotting, die-hobbing, and pressing. For the plastics industry, Baldwin offers a modern line of molding presses to meet every need.



For further information write to the nearest Baldwin office.

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Birmingham, Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington.

BALDWIN

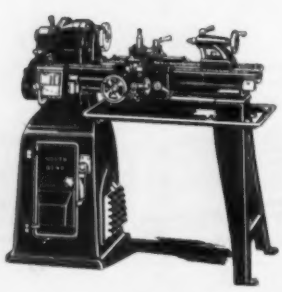
HYDRAULIC PRESSES

YOU CAN'T WIN THE DERBY WITH A PLOW-HORSE

And using heavy machine tools for light, fast jobs is just as inappropriate. Your production costs just can't stay in the running when this is done. Yet, the mismatching of machines and jobs is common.

You should investigate South Bend Lathes if you are machining small, precision parts. This is the type of work for which they are built. Their speed of operation and ease of handling make possible fast machining. Their precision speeds close tolerance work. And the fine finishes they produce often eliminate additional operations.

Use South Bend Lathes for low-cost machining of small parts . . . and put the production "plow-horses" back on the jobs for which they were intended. Write for Catalog 100-F.



10" Quick Change Gear Lathe

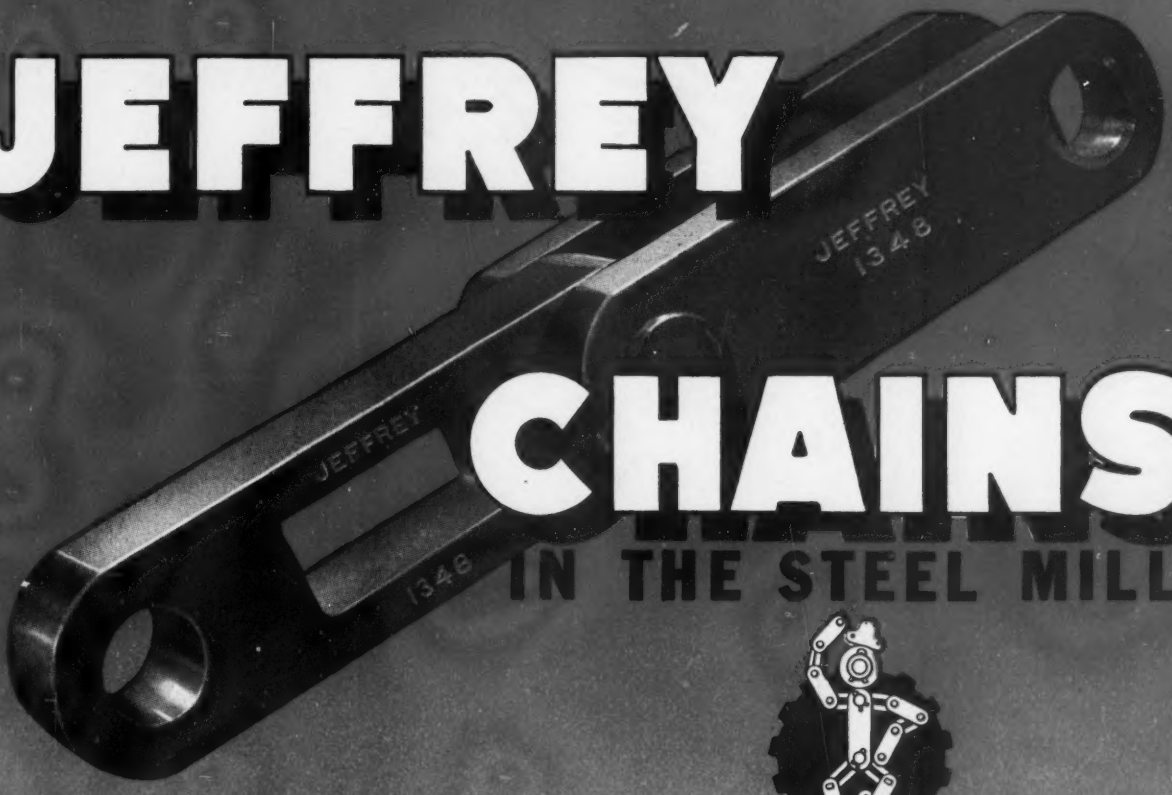
South Bend Quick Change Gear and Toolroom Lathes are made with 9" to 16" swings. Precision Turret Lathes with ½ inch and 1 inch collet capacities.

SOUTH BEND LATHE WORKS

429 EAST MADISON STREET • SOUTH BEND 22, INDIANA

BUILDING BETTER LATHES SINCE 1906

JEFFREY CHAINS IN THE STEEL MILL



CROP CONVEYORS

Carrying white hot, large and small, irregular and jagged crops is the 24-hour lot of a crop conveyor. While it conveys only waste material, its job is of prime importance in the cycle of continuous steel production. With full knowledge of this service demand, Jeffrey builds its Vulcan chains methodically . . . by careful selection of materials, precision manufacture, and uniform heat treatment . . . to impart higher strength, greater wear resistance, superior performance. Check the extra economic value of Vulcan chains in quality and construction. That same degree of superiority is found in all Jeffrey chains applicable to steel mill service.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

889-99 North Fourth St., Columbus 16, Ohio

Baltimore 1 · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 13 · Denver 2 · Detroit 13 · Harlan · Houston 5 · Huntington 19 · Jacksonville · Milwaukee · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 3 · Salt Lake City 1 · Scranton 3

Complete Line of Material Handling, Processing and Mining Equipment

FERRY CAP *Precision...*

Helps Keep 'em Rolling!

● This Ferry Cap Spring Bolt is a vital part of the truck.

The truck manufacturer engineered the bolt; we made it with precision becoming the careful engineering.

The bolt has maximum ground surface wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough —more than equal to the required thread strength.

The bolt fits perfectly. The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs.

It is a spring bolt of which the truck manufacturer can well be proud—a clean-cut, precision-made, long-wearing, tough, dependable product.

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.

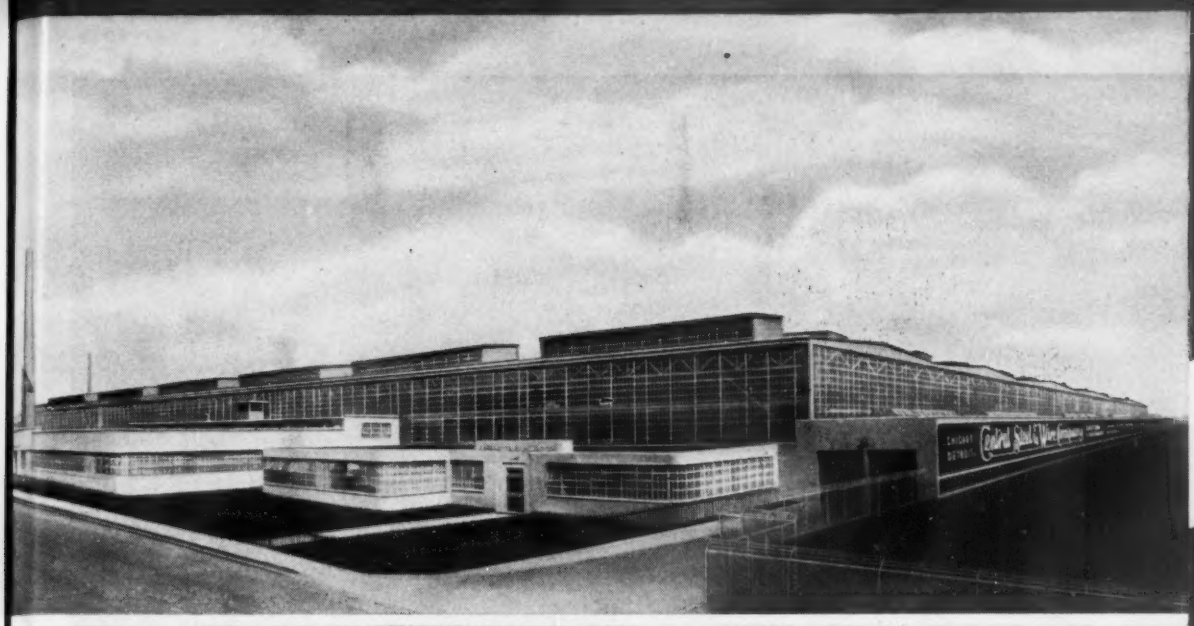
HAVE YOU A FASTENER PROBLEM? . . . . .
IF SO WE'D LIKE TO DISCUSS IT WITH YOU

The FERRY CAP & SET SCREW Co.

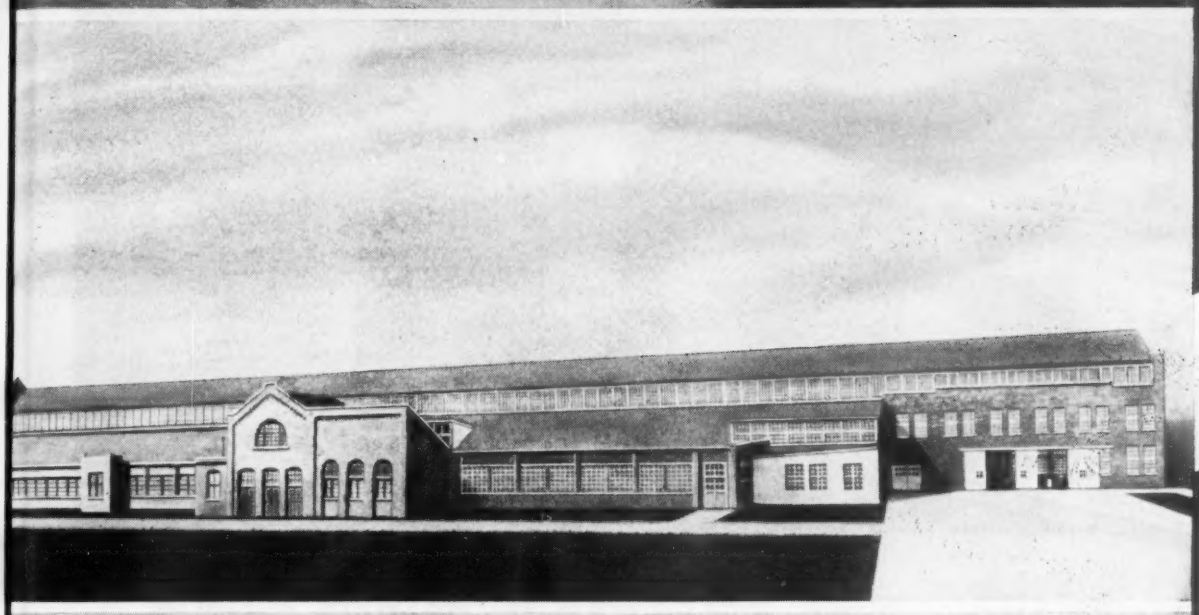
2159 SCRANTON ROAD Dept. A-12 CLEVELAND 13, OHIO

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS



Chicago



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Immediate Warehouse Shipments

Central Steel

& WIRE COMPANY

OFFICES AND PLANTS

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AVON 2230

TELETYPE NUMBERS: CHGO 1269 • DET 33 • CIN 64

Housing for the exhaust fan which serves as a mammoth lung to provide fresh air to this West Virginian coal mine.

THE "BLOWHARD" THAT SAFEGUARDS MINERS' LIVES

Another top performance by a BWH product

In the busy 1943 days of peak war production, a big West Virginia coal mine needed a transmission belt for its giant exhaust fan.

Because this fan supplies fresh air to workers far underground, high speed operation with no shutdowns was vitally important. Tragic disaster may stalk tunnels where heavy, gas-laden air accumulates, and workers get out of a mine as fast as possible if the ventilating system breaks down.

To handle this responsible job, BWH engineers specified a 36-inch, 9-ply Bull Dog Cord Belt with quality-controlled friction. The rugged silver-hard duck cover adequately protects the low-stretch cord carcass of the belt. As a result, resiliency and recovery factors are assured under peak loads . . . trouble-free operation is maintained at maximum efficiency.

Working at a speed of more than a mile a minute, this rugged belt has chalked up an outstanding performance record . . . and it's still driving this huge safety fan, after four years of hard service.

Made by the exclusive ROTOCURE process of continuous vulcanization, BWH Belts have no "weak links" caused by press overlaps. And that means they assure steady operation, long life and low maintenance costs on the toughest jobs.

All BWH Industrial Rubber Goods are engineered for just one purpose . . . that is, to do a specific job extra well. Leading industries know they can always look to BWH for dependable ruggedness — to BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems — we're specialists in solving them. Consult your nearest BWH distributor, or write directly to BWH.

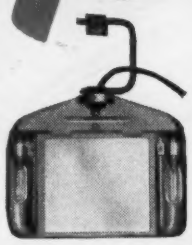
Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

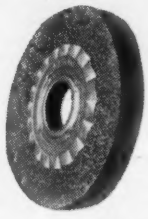
Distributors in all principal cities

PLANT: CAMBRIDGE, MASS., U.S.A. • P.O. BOX 1071, BOSTON 3, MASS.

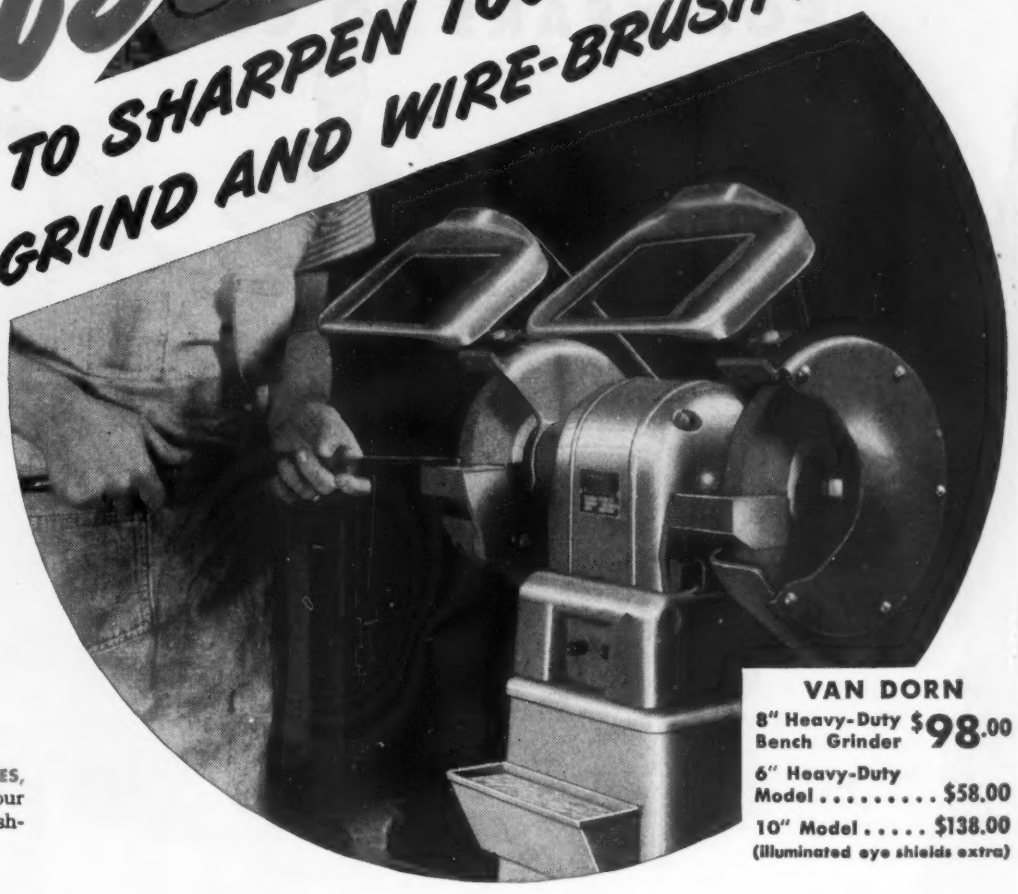
Power TO SHARPEN TOOLS, GRIND AND WIRE-BRUSH METALS



ILLUMINATED EYE SHIELDS combine "flood-light" on work and complete eye protection. Glass is shatter-proof and work is completely illuminated from both sides.



"WHIRLWIND" WIRE WHEEL BRUSHES, designed and built right in our plant, give longer life, better brushing surface.



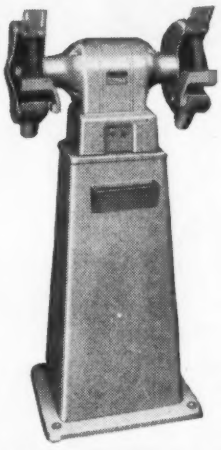
VAN DORN

8" Heavy-Duty Bench Grinder **$98.00**

6" Heavy-Duty Model **$58.00**

10" Model **$138.00**

(Illuminated eye shields extra)



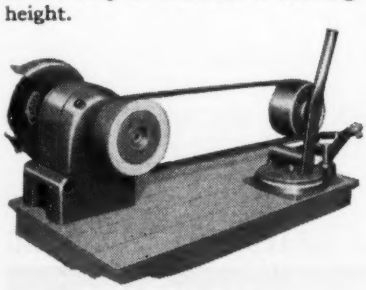
STREAMLINED PEDESTALS permit spotting these Grinders anywhere in the shop at convenient working height.

. . . faster than ever before!

We've put famous Van Dorn *power* to work in a completely modern Bench Grinder Line that's setting new highs for better, faster tool sharpening, grinding, wire brushing, buffing, burnishing, polishing and finishing! You'll find feature after feature, that you've always wanted in a Bench Grinder, incorporated in these new models and accessories!

1. Modern, streamlined design improves working clearances, reduces weight.
2. Dependable Van Dorn-built "constant speed" motors maintain correct operating speed.
3. U-shaped tool rests improve tool sharpening support . . . adjustable on strong steel wheel guards.
4. Perforated tool rests and exhaust outlets, connectible to dust-collector, keep working area free of abrasive dust . . . on 8" and 10" Grinders only.

Remember: there's a Bench Grinder exactly suited to your needs in the popular size Van Dorn Line. So ask your nearby Van Dorn Distributor for compete information today. Write for your free copy of our catalog to: The Van Dorn Electric Tool Co., 720 Joppa Road, Towson 4, Maryland.



BACK-STAND IDLER utilizes abrasive belt grinding for more abrasive surface, maximum grinding speed at all times, faster work at lower cost.

FOR POWER SPECIFY

"Van Dorn"

(DIV. OF BLACK & DECKER MFG. CO.)

PORTABLE ELECTRIC TOOLS

REFLECTS SATISFACTION FOR YEARS TO COME!

Bonderizing

preserves and protects fine finishes!

The sleek, shiny, smooth *look* of a car is one of the owner's greatest satisfactions. And to prolong that satisfaction, most manufacturers provide lasting fine finish protection by Bonderizing.

By a simple, economical chemical conversion process, Bonderizing changes the surface of metal to a fine, tight nonmetallic crystalline coating. These Bonderite crystals anchor paint tightly to metal, greatly retard rust and corrosion, minimize the spread of finish failure around accidental scratches and finish injuries, preserve fine appearance.

Bonderizing is used by most manufacturers of cars, trucks, and buses, and by leading manufacturers in many other fields. It's a product improvement and a sales feature.

Your product should have the advantages of Bonderizing!

PARKER RUST PROOF COMPANY, 2158 East Milwaukee Ave., Detroit 11, Michigan

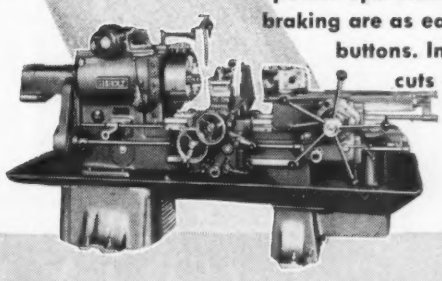
BONDERIZING	PARKER PROCESSES	PARKERIZING	PARKER PROCESSES	PARCO LUBRIZING
Holds Paint to Metal		Inhibits Rust		Retards Wear on Friction Surfaces

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

GISHOLT TURRET LATHES

Finger-tip spindle control starts, stops, or reverses the spindle. Saves time--saves effort--saves money

It's power-operated. Clutching and braking are as easy as pressing buttons. Instant response cuts time lag, steps up production.



GISHOLT MACHINE COMPANY *Madison 3, Wisconsin*

The GISHOLT Round Table represents the collective experience of specialists in the machining, surface-finishing, and balancing of round and partly round parts. Your problems are welcomed here.

turret lathes • automatic lathes • superfinishers • balancers • special machines

How to say "Merry Christmas" in grinding wheel language

Present your management with year-'round savings in your grinding wheel usage.

Such savings would be welcomed by any management—and here's how to do it:

Call in Peninsular Engineers for a study of your grinding. They will analyze your grinding operation completely—your machines, your wheels and the metals you grind.

After this analysis, they will show you how to get greatest results for lowest cost, a Peninsular specialty since 1889. This service costs you nothing, but may save you a lot. You can't afford to overlook it!

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

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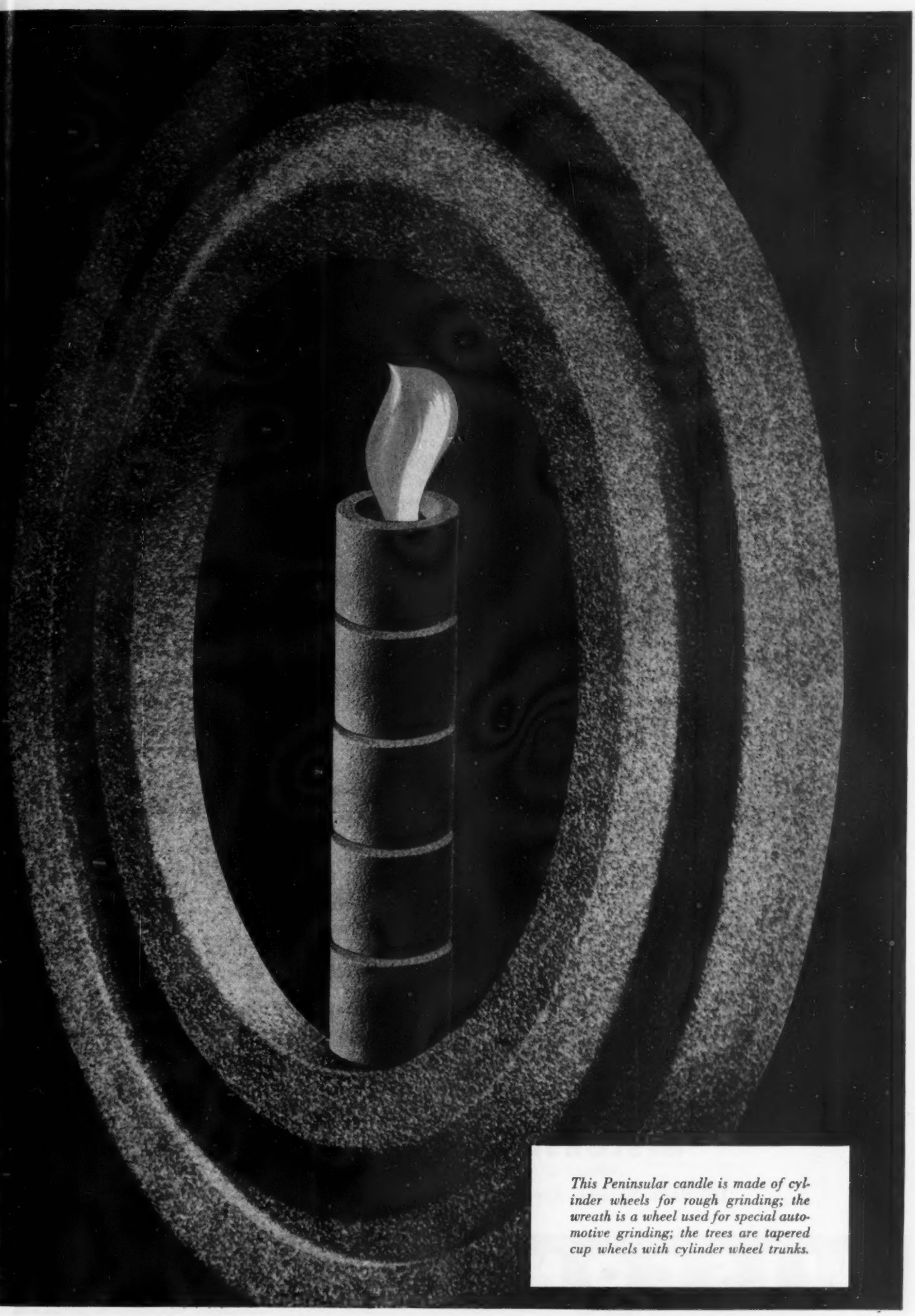
INDIVIDUALLY PENINSULAR ENGINEERED

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS



This Peninsular candle is made of cylinder wheels for rough grinding; the wreath is a wheel used for special automotive grinding; the trees are tapered cup wheels with cylinder wheel trunks.

YOUR steel requirements can best be served by a progressive, superbly staffed, completely integrated steel producer. WISCONSIN is exactly that.

Progressive is more than a word at WISCONSIN. It's a *fact* that has been demonstrated by our development of Sulfite-Treated Steel—the highly machinable steel that overcomes the faults of resulphurized steels. "H" steels of guaranteed hardenability are a specialty of ours. Both of these steels are earning wide acceptance and acclaim.

Superbly Staffed by top-flight steelmen, WISCONSIN has one prime objective: to make the best possible steel for our customers. Every man in the mill works toward that goal.

An Integrated Organization gives WISCONSIN complete control of the product from the ore mines to the customer. That control means finer steel.

Watch WISCONSIN for steel progress. We can't supply all the steel our customers need but the picture is improving. We haven't compromised with quality. Our sales and metallurgical staffs are ready to serve you.

WISCONSIN STEEL OPERATIONS

Ore Mines • Coal Mines • Ore Freighters
Blast Furnaces • Open Hearth Furnaces • Rolling Mills
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WISCONSIN STEEL COMPANY

(Affiliate of International Harvester Company)

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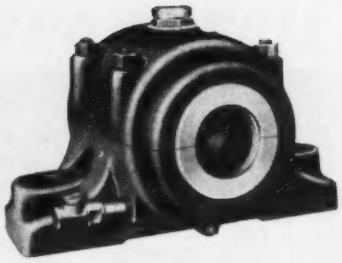
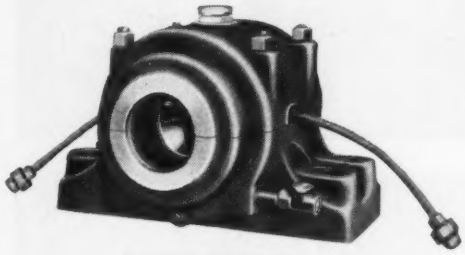
WISCONSIN STEEL

FAN AND BLOWER BEARINGS



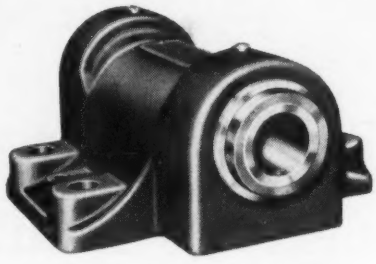
SLEEVOIL PILLOW BLOCK

A precision-built, ring-oiling babbitted bearing, self-aligning and exceptionally quiet. Special seals prevent oil leakage and keep dirt out. Field-proved by thousands of installations.



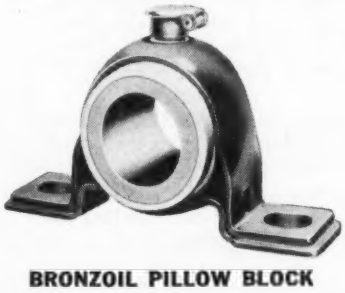
WATER-COOLED SLEEVOIL PILLOW BLOCK

Designed for applications where higher temperatures are encountered. Shaft sizes from 1-11/16" to 8". Widely used under industry's toughest operating conditions.



DH BALL BEARING FAN AND BLOWER PILLOW BLOCK

Single row, deep groove ball bearings for No. 2 arrangement. Inner race extended to form sleeve which carries shaft. Piston ring seals retain lubricant, exclude dirt. Shaft sizes 15/16" to 2-1/4". A favorite where compactness is at a premium.



BRONZOIL PILLOW BLOCK

Capillary bronze bushing has capacity of one-third its volume in oil. Reservoir with close fitting wick around bushing provides ample lubrication. Oil resistant and static proof grommets available for noise isolation. Sizes 1/2" to 1-1/4". America's standard for light applications.

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America's Most Complete Line

Working closely with air conditioning equipment manufacturers, Dodge of Mishawaka has developed bearings to meet the exacting operating conditions encountered in this industry. Cost-saving products for the mechanical transmission of power are manufactured by Dodge for use in all industries.

DODGE MANUFACTURING CORPORATION • MISHAWAKA, INDIANA

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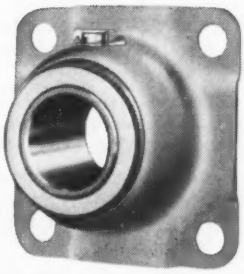
of Mishawaka, Ind.



BRONZOIL FLANGED BEARING

Mounted in heavy gauge steel flanged housing this bearing has the basic Bronzoil construction and characteristics as described at the left. Sizes 1/2" to 1-1/4". A proven performer in a new mounting.

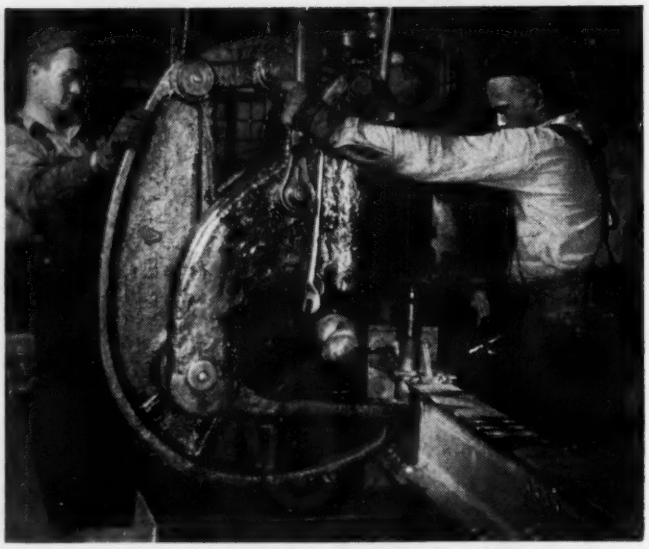
CALL THE TRANSMISSIONEER

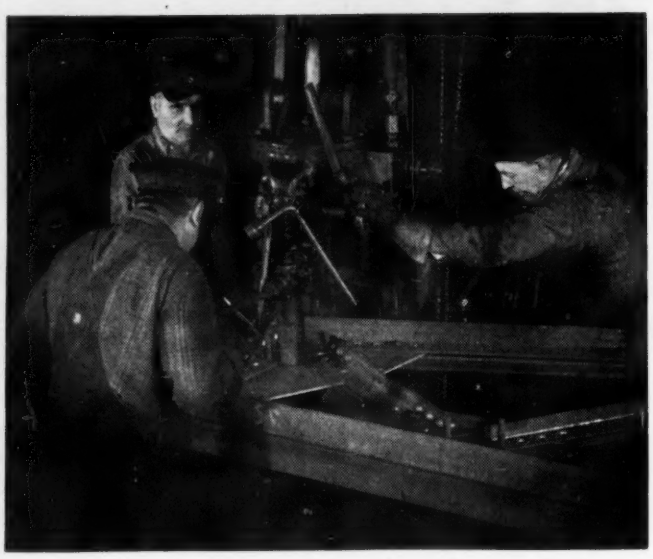
your local Dodge distributor, for information about the line of Dodge bearings for fan and blower service—and for news about Dodge products to cut costs and increase production in all industries. Look for his name under "Power Transmission Equipment" in your classified phone directory.

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

Here's what we mean by *MULTIPLICITY* *MULTIPLICITY* OF EQUIPMENT





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Riveters at work in three Allied plants at the same time give vivid demonstration of what we mean by multiplicity of equipment. Here is your assurance that fabrication jobs at Allied never choke in a bottleneck but rush to completion.

Each Allied plant is a completely equipped unit. When riveting, welding, or any process in the fabrication of steel or aluminum overloads one plant, Plant 2 or Plant 3 or both take over. Here the job is completed on the same type of equipment, under the same skillful control.

New time-saving techniques and unified control speed fabrication toward due-date deliveries. Both management and men are proud of the fact that those dates are invariably met.

Send your plans and specs to Allied for quotation. Thousands of tons . . . for bridges, buildings, or ships . . . or one-ton lots for smaller projects get the same careful consideration.

ALLIED *"to Win in War or Peace"*

STRUCTURAL STEEL COMPANIES

3 FABRICATING PLANTS

with Combined Facilities

Working as one Huge Corporation

BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE CRANES...30 • 35-40 • 40-50 TON CAPACITIES

PATENT APPLIED FOR

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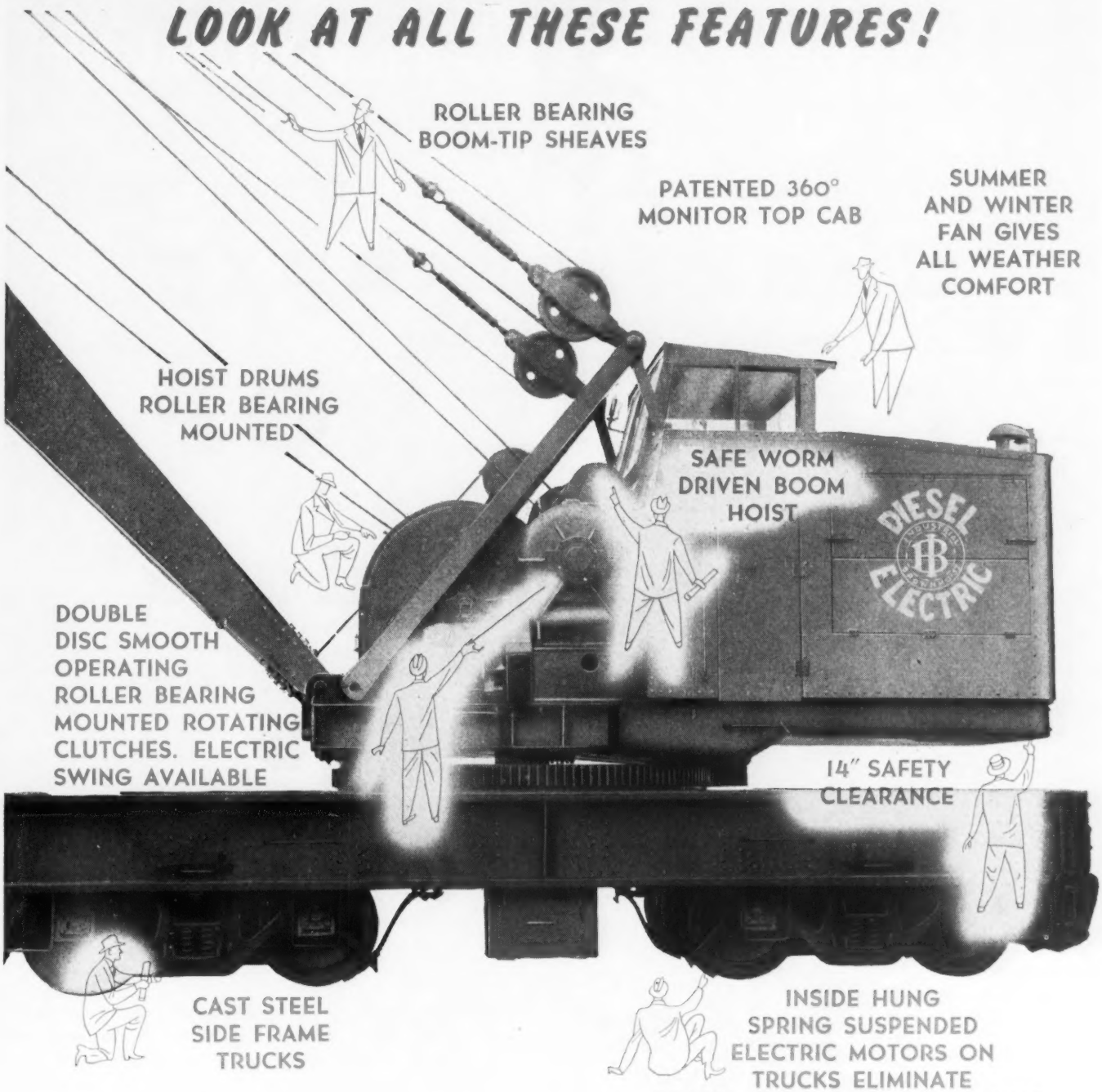
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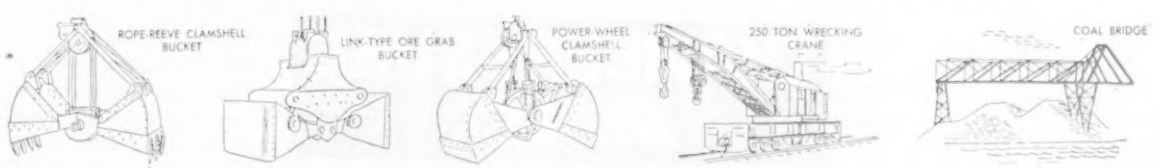
BROWNHOIST BUILDS BETTER CRANES



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The New Chambersburg CECO-DROP will out-produce any existing gravity drop hammer

CHAMBERSBURG
Builders of IMPACT Machinery

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J&L STEEL

For Longer Wear—Less Repair

Use JALLOY Heat Treated Steel

SAVE "TIME-OUT" FOR REPAIRS—SAVE STEEL—SAVE MONEY WITH ABRASION RESISTING JALLOY

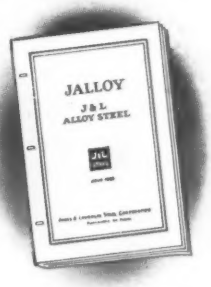
You can reduce your labor and steel costs—increase your productive operating time, by using heat-treated Jalloy, the special abrasion-resistant steel. Heat-treated Jalloy reduces labor, material and continual maintenance expense on equipment handling abrasive materials. Heat-treated Jalloy reduces down-time for repairs because of its longer life!

Heat-treated Jalloy is a custom-made manganese-molybdenum steel, designed by J & L to meet your specific needs in resisting wear and heavy shocks. Its strength, toughness and resistance to abrasion over ordinary steel has been *proved* in handling rock, coal, slag, sand, cinder and other abrasive materials. Heat-treated Jalloy is available in bars and plates that can be welded readily to form tough, long-wearing surfaces on truck beds and tailgates, scraper and bulldozer blades, dragline and power shovel buckets, rock crusher parts, sand blast cabinets, chutes for mines, quarries and mills.

Manufacturers of new equipment can increase the salability of items made from JALLOY—by giving longer wear, less repair.

Maintenance men can increase the life of old equipment by installing JALLOY in places where *wear* means *repair*.

If you are seeking the solution to a troublesome abrasive problem, heat-treated Jalloy is the answer. Ask a J & L representative to call and assist you. His experience in saving money and time on similar problems will be valuable. Call him in today and get the complete story on Jalloy, the steel for longer wear—less repair. Or write for your copy of "Jalloy" a technical bulletin giving typical physical properties, chemical composition, impact and hardness values and welding data. Address, Room 1011, Jones & Laughlin Bldg., Pittsburgh 30, Pa.



JONES & LAUGHLIN STEEL CORPORATION

Another example of J & L Steel at work Saving money for you . . .

It's the SIDES OF A V-BELT That Really GET the WEAR!

-- ONLY the SIDES Touch the pulley!

Diagram of V-Belt in Sheave Groove

The *SIDES Do ALL the GRIPPING*

—They Pick Up ALL the LOAD!

The moment you think about it, you realize, of course, that the *sidewall* is the part of a V-Belt that really gets the wear.

It's the *sidewall* that has to grip the pulley. It has to *pick up* all the power from the driver pulley, transmit that power to the belt as a whole and then, once more, deliver the power to the driven pulley. And the sidewall takes all the wear against the sheave-groove wall.

That is the perfectly natural reason why you have always noticed that the sidewall of the *ordinary* V-Belt is the part that *wears out first!*

Now See How the Patented CONCAVE SIDE SAVES Sidewall Wear—Lengthens Belt Life.

Since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the middle of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belt can possibly give.

—and the Concave Side is *MORE IMPORTANT NOW* Than Ever Before!

Now that Gates *SPECIALIZED* Research has resulted in Super Vulco Ropes capable of carrying much heavier loads —up to 40% *higher horsepower ratings* in some cases— the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

The CONCAVE SIDE is a GATES PATENT

Straight Sided V-Belt

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall —and that means much longer life for the belt"

4712

THE GATES RUBBER COMPANY DENVER, U. S. A., *"World's Largest Makers of V-Belts"*

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

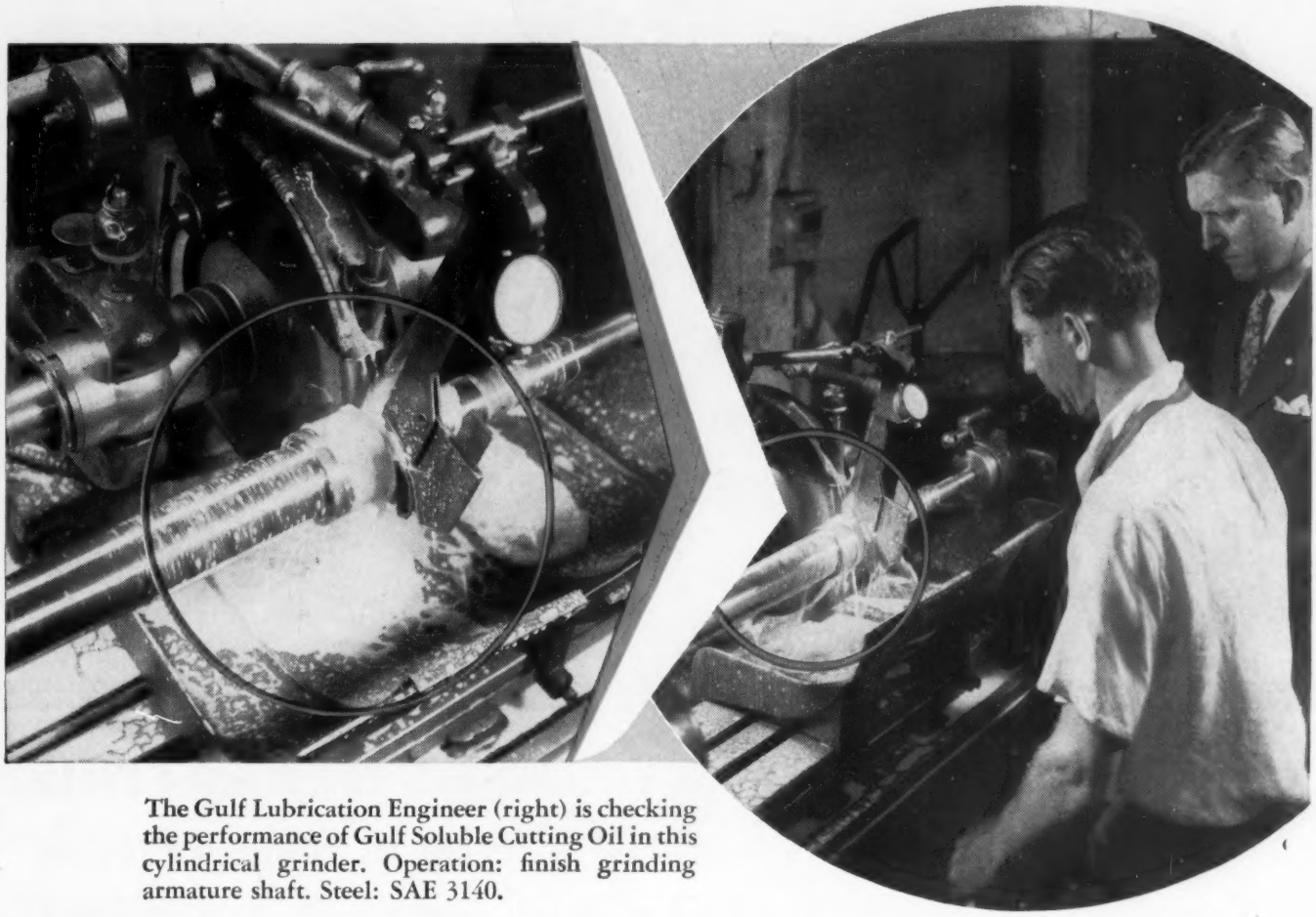
Gates

THE MARK OF SPECIALIZED RESEARCH

"Gulf Soluble Cutting Oil

keeps our grinding wheels clean and free-cutting"

says the management of this progressive plant



The Gulf Lubrication Engineer (right) is checking the performance of Gulf Soluble Cutting Oil in this cylindrical grinder. Operation: finish grinding armature shaft. Steel: SAE 3140.

"AFTER SEVERAL UNSUCCESSFUL attempts to eliminate rancidity and wheel loading, we switched to Gulf Soluble Cutting Oil," says the management of this progressive plant. "With this fine soluble oil, we've solved our problem once and for all—our grinding wheels are always clean and free-cutting."

"Gulf Soluble Cutting Oil also gives us effective protection against rust, forms an exceptionally stable emulsion, and doesn't gum up our machines."

A typical report from the ever-growing group of progressive plants who use Gulf Soluble Cutting Oil! Preferred because it combines all the qualities needed to do a better machining and grinding job: exceptional stability, improved miscibility, effective rust preventive properties, pleasant odor—and it's non-foaming.

For further information on Gulf Soluble Cutting Oil—and for one of Gulf's practical slide-rule type calculators, which will help you maintain desired soluble oil concentrations—send the coupon below.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
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Gulf Oil Corporation · Gulf Refining Company
3800 Gulf Building, Pittsburgh 30, Pa.

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- ☐ Further information on the new Gulf Soluble Cutting Oil.
- ☐ Practical slide-rule-type calculator for help in maintaining desired soluble oil concentrations.

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Company.....

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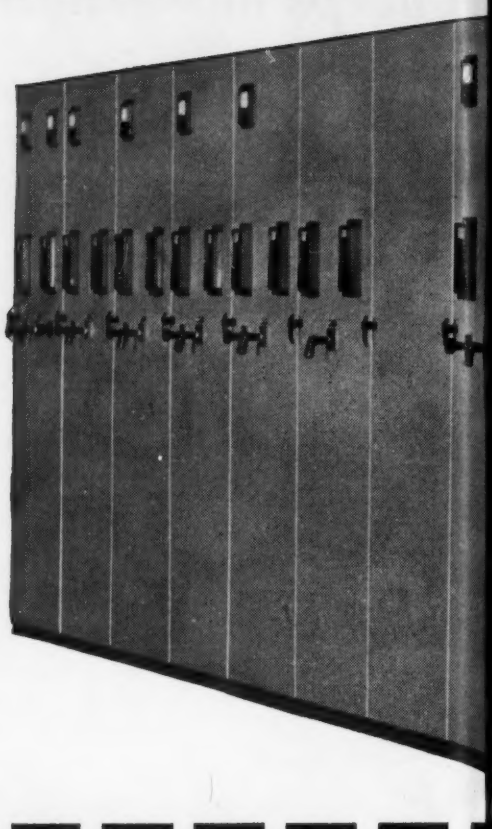
Install *AIR BLAST* Metal-Clad

PLAY IT SAFE!



Guard Against Damage to Valuable Mill Equipment • Protect Rolling Mill Motors by Rapid Clearing of Faults • Provide Complete Safety for Your Men • Install Factory-Built, Factory-Wired Allis-Chalmers Metal-Clad Switchgear with *Air Blast* Circuit Breakers!

THIS IS THE *ONLY* DRAWOUT VERTICAL LIFT METAL-CLAD SWITCHGEAR equipped with *Air Blast* circuit breakers! That means a space-saving lineup of switchgear that is easily inspected and maintained . . . centralizes power control . . . protects personnel . . . and reduces potential fire hazards.

Drawout construction permits ready access to circuit breakers during inspection and maintenance—and interrupting with air blast reduces arcing time to less than a cycle insuring long contact life. *Air Blast* breakers are mechanically strong to withstand repeated "closing-opening" operations. *They consistently complete interruption within four to five cycles!* These 7.5 and 15 kv units have interrupting capacities of 250,000 and 500,000 kva.

For more information, contact your nearby A-C office, or write for *new* bulletin 18B6760. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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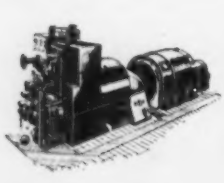

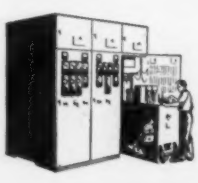

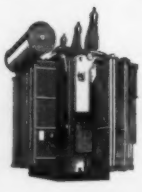

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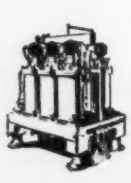

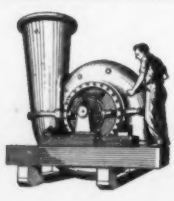

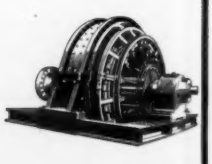

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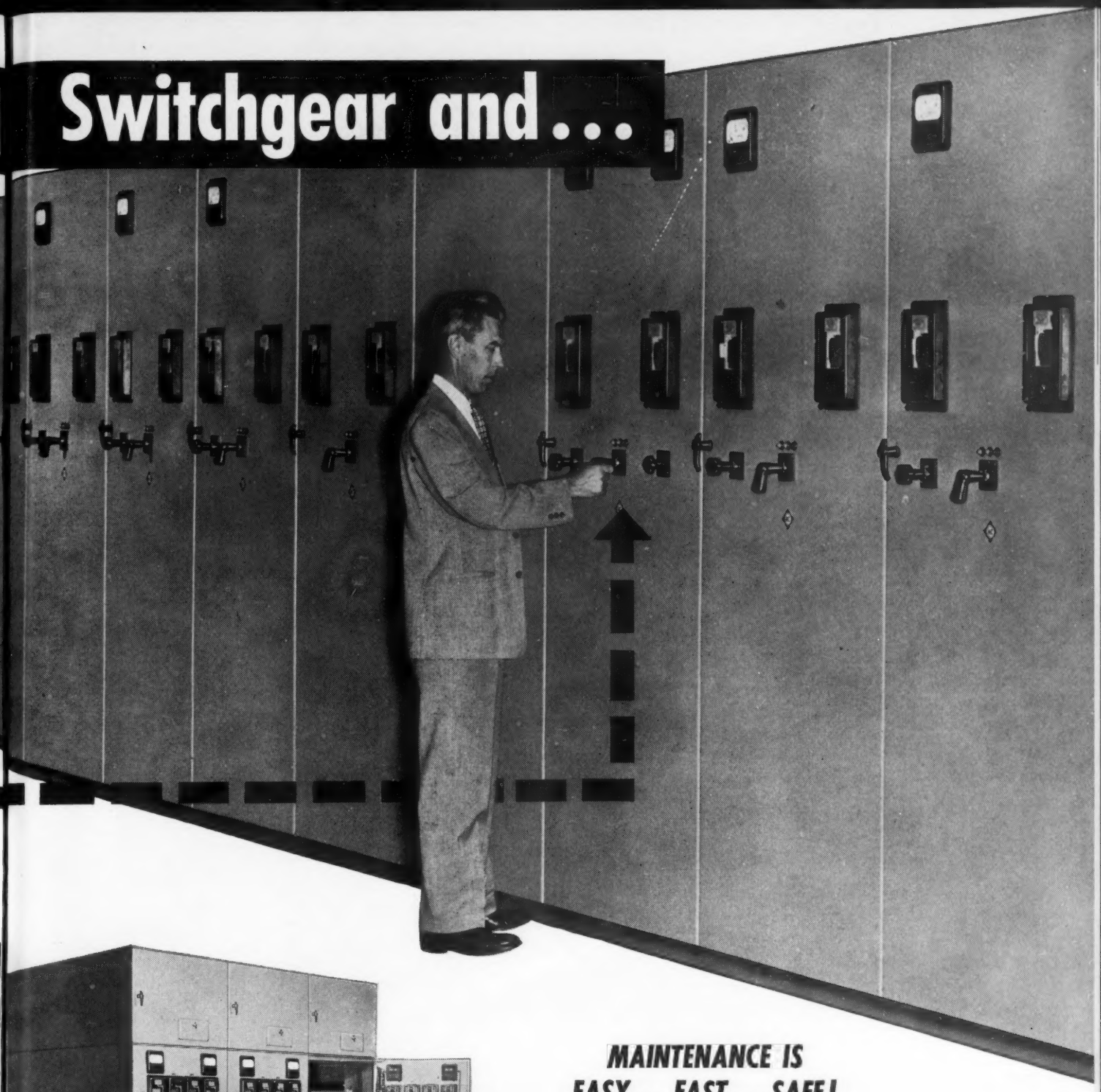

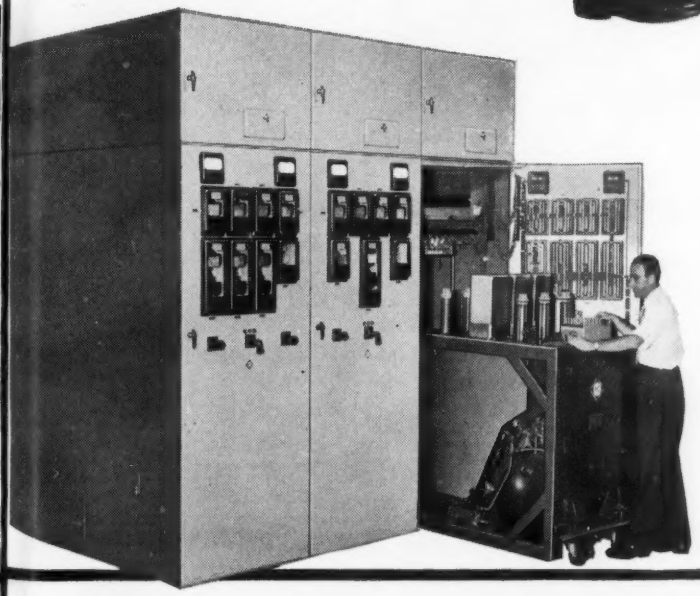

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LOWER BREAKER to floor by means of electrically operated motor-lift . . . pull it from structure . . . and roll it away to convenient test stand—that's all it takes! Breaker cannot be lowered when in the closed position because of positive interlocks . . . and automatic shutters prevent accidental contact with live parts—that's added safety for personnel during inspection and maintenance!

A 2360

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One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

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PRESS BRAKES with Capacities ranging from 5 ft. of 16 gauge to 20 ft. of ½ inch steel plate!

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Here is the Electrode for strong, machinable cast iron welds

...WILSON No. 575

This all-position, AC-DC electrode produces machinable welds of high tensile strength and great ductility.

Smooth flowing, thin spreading, the Wilson No. 575 will take a multiple pass without separating or pulling away from the cast iron. The deposited metal is smooth and uniform and well bonded to the cast material.

It is recommended for, and has produced excellent welds on, cylinder blocks and heads, bearing blocks, large frames, filling up holes and building up mis-machined areas. Because of the nature of the deposited metal, numerous applications exist in the repairing of castings in service where it is necessary to machine, drill or tap the repaired sections.

However, the applications for Wilson No. 575 are not limited to those welds in cast iron that require machining, but include also the repairing of cast sections where machining is not required. It also may be used for fabrication involving cast iron parts.

Wilson Arc Welding Electrode Catalog ADW-75 gives complete information on the other electrodes which make up the Wilson line. For your free copy fill in the coupon below and mail to us or to your nearest Wilson distributor.

WILSON

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General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

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Please send me a copy of Wilson Electrode Catalog ADW-75 together with the latest electrode price list.

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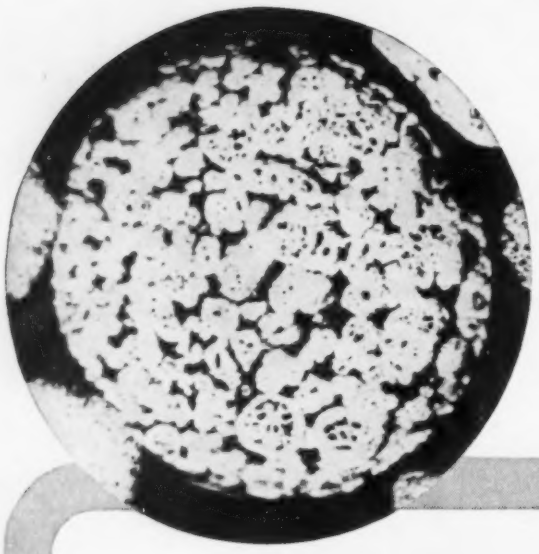
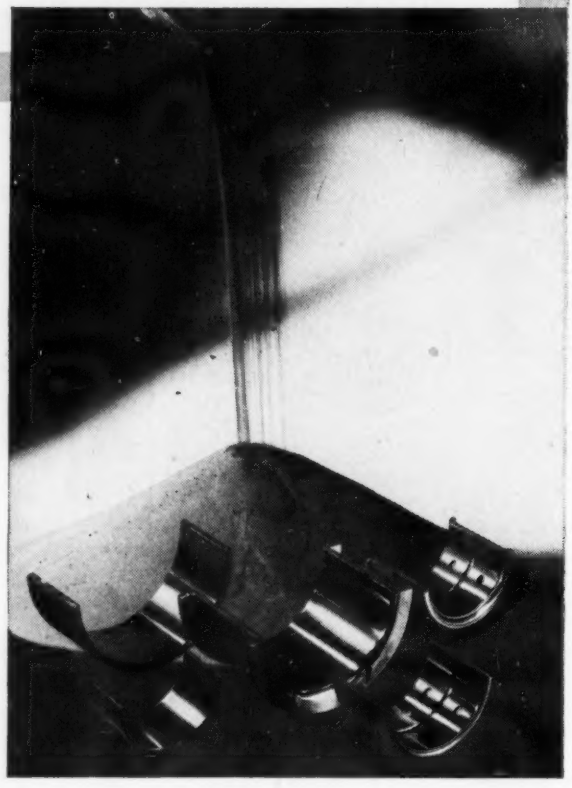


Photomicrograph (750x) of a copper-lead alloy particle. The copper is light, the lead dark.

The Particle that DOES make a Difference!



Each powder particle is in itself an alloy of the desired proportions of copper and lead in our improved sintered copper-lead bearings, which have these advantages:

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- Excellent lead distribution. No segregation.
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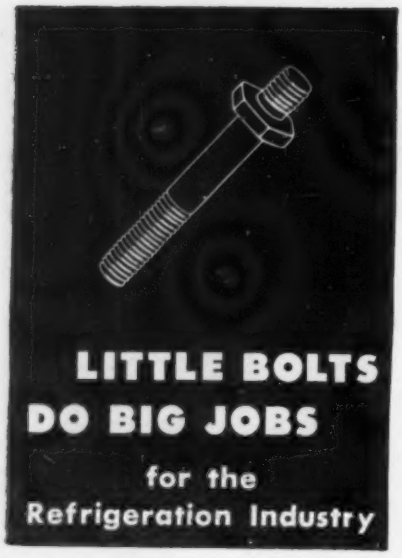

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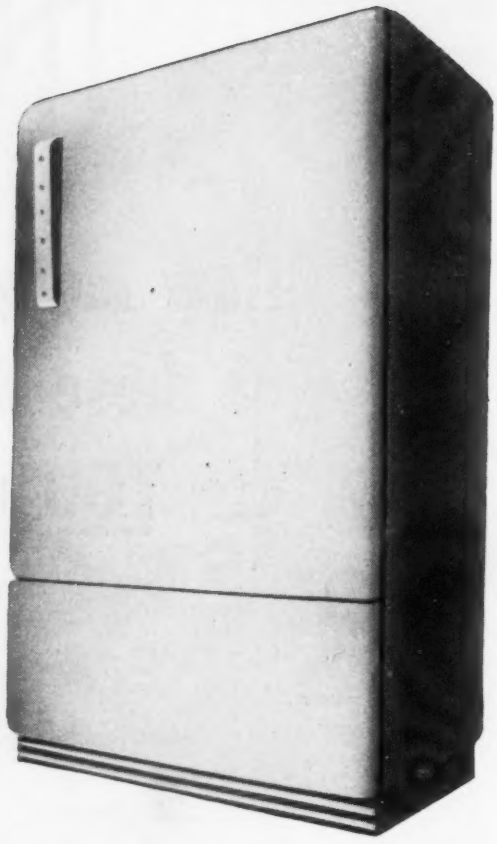
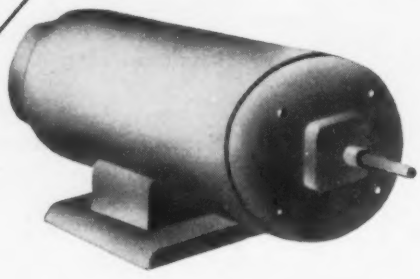
for the Refrigeration Industry





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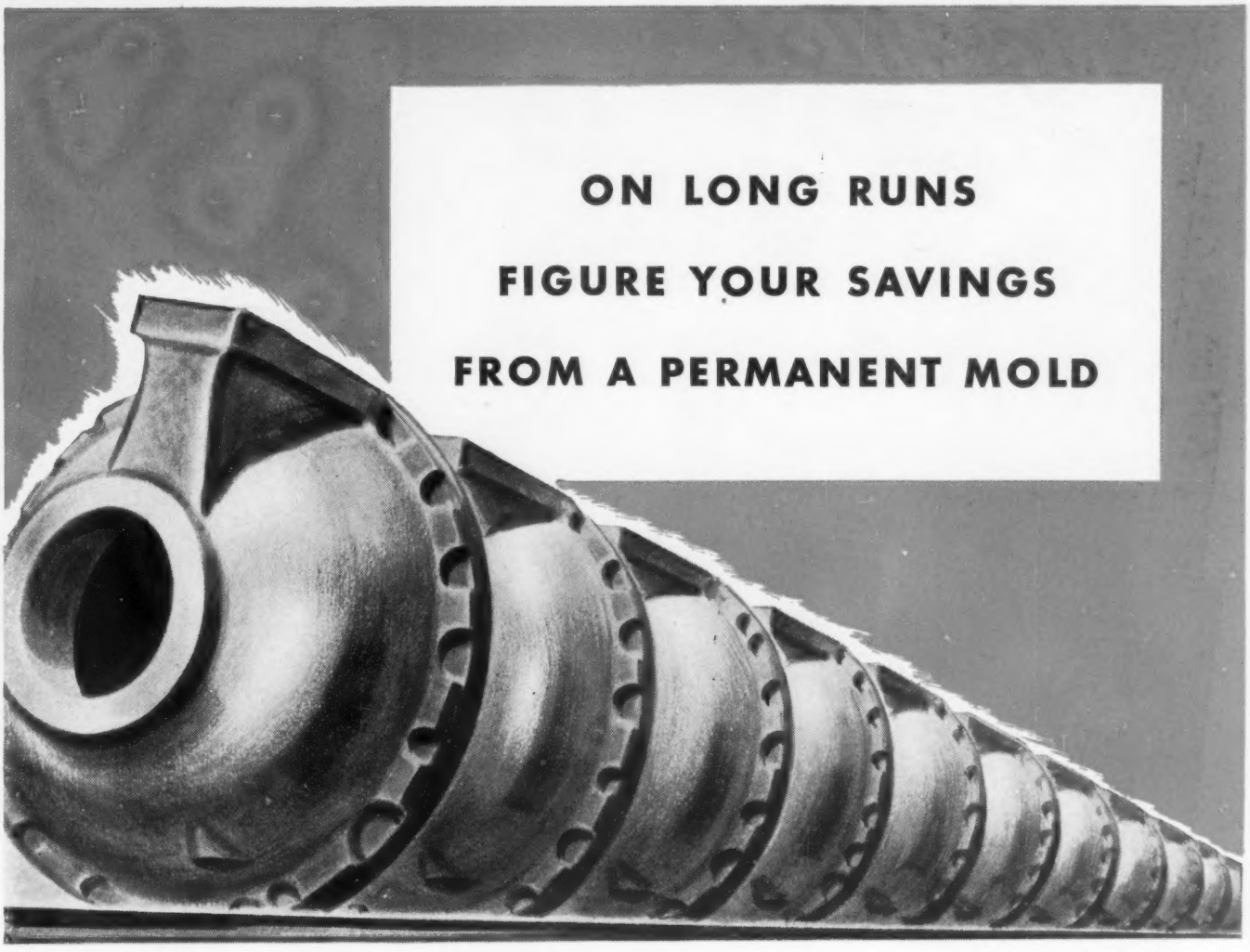

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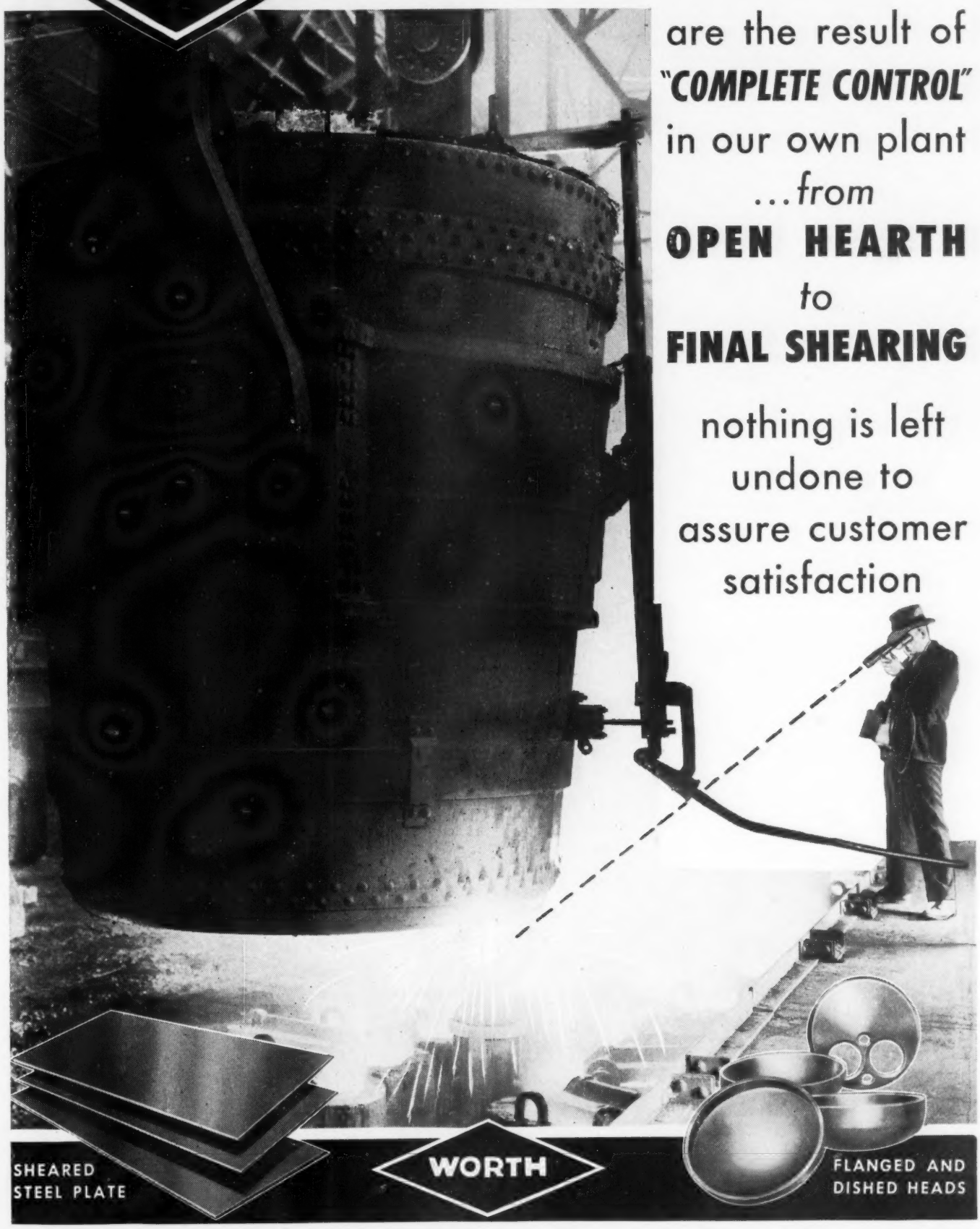
WORTH STEEL PLATES



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in our own plant
...from
OPEN HEARTH
to
FINAL SHEARING

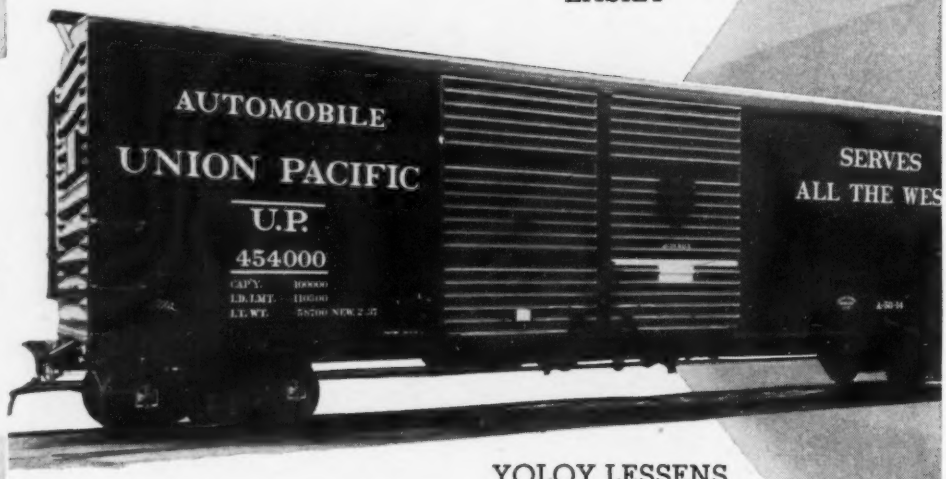
nothing is left
undone to
assure customer
satisfaction

WORTH STEEL COMPANY • Claymont, Delaware

Yoloy stars with 5-point performance

YOLOY INCREASES PAYLOAD

YOLOY FABRICATES EASILY



YOLOY REDUCES DEADWEIGHT HAUL

YOLOY LESSENS MAINTENANCE EXPENSE

YOLOY LENGTHENS USEFUL LIFE

QUALITY YOUNGSTOWN SERVICE

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CARBON - ALLOY AND YOLOY STEELS

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LINDE process service cuts production corners

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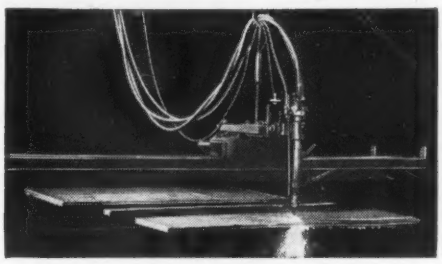
LINDE Process Service is available to all LINDE customers through any LINDE office.



Stainless steel plate, difficult to oxygen-cut by usual methods, can be quickly cut to size and shape by powder-cutting.

Scrubbing steel with a brush of flame removes scale, rust, and surface moisture prior to painting. This is flame-priming, a LINDE development.

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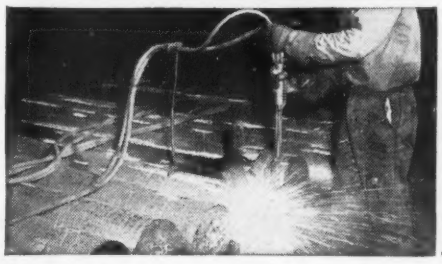

The design of a simple jig for centering cold rounds—or the design of a completely mechanized flame-conditioning installation — are examples of LINDE Process Service.

Linde

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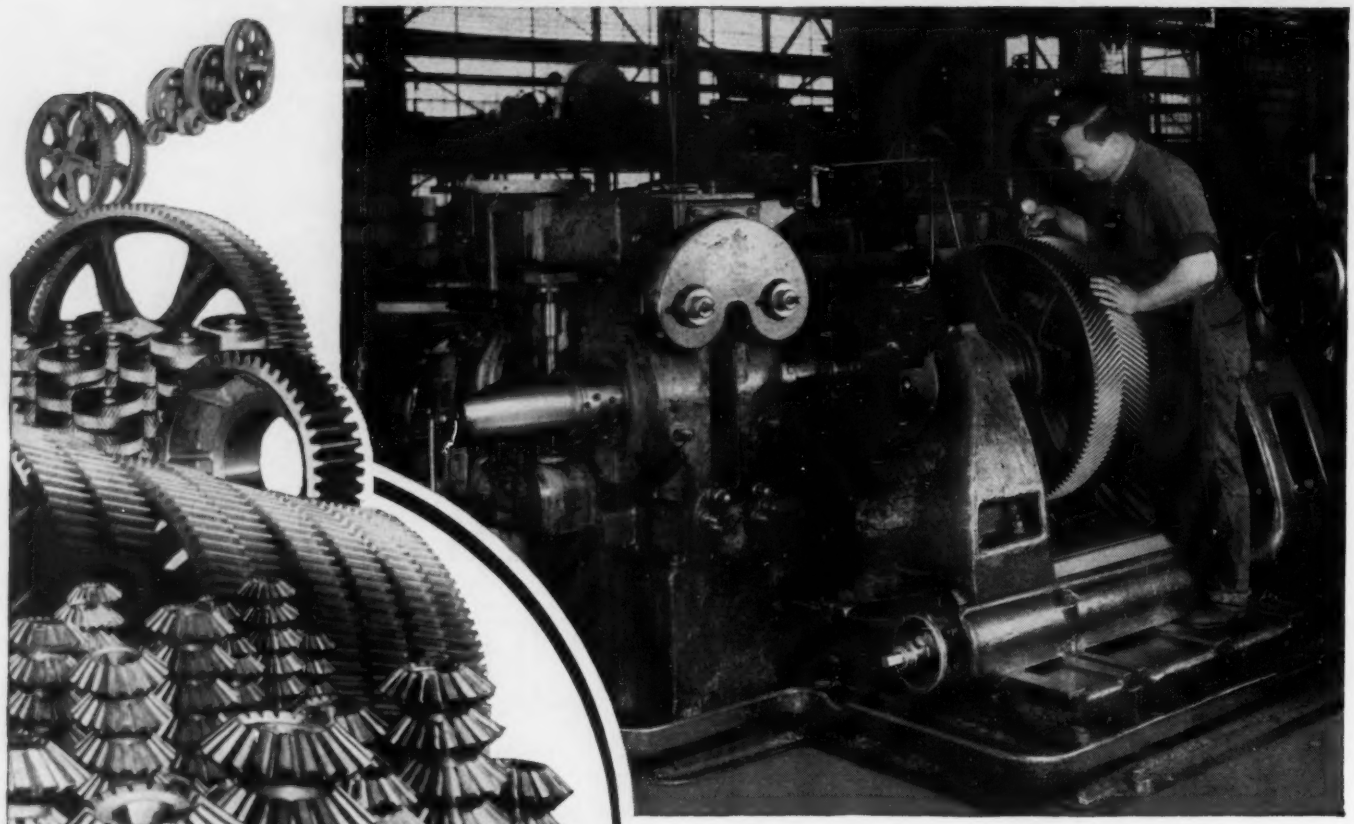

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(NE) is the symbol of quality recognized by users of industrial gears everywhere. Our Foundries specialize in Gear Blank Castings of Alloy and Carbon Steel. The facilities of the National-Erie Corporation at your command, permit complete control from raw material to the finish machined gears. Spur, bevel and Sykes Herringbone of Neloy (or Neloy Moly) meet with outstanding success in industry because they are giving excellent service in many varied applications.

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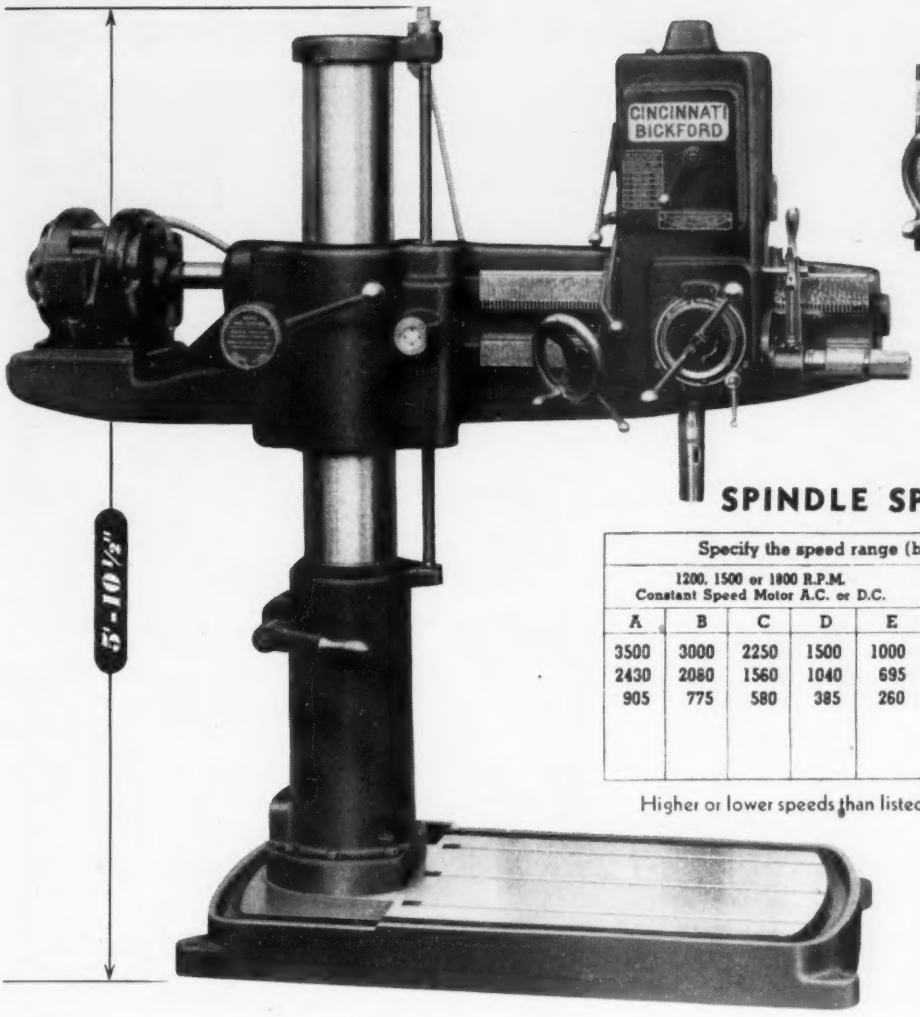
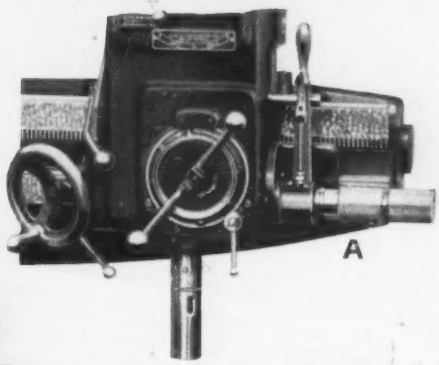




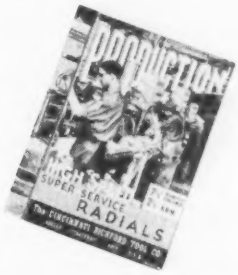
Hand wheel is operated by left handle, while right hand (grip A) controls advance and return of spindles and automatically controls direction of spindle rotation.

SPINDLE SPEED RANGES

Specify the speed range (by letter) that meets your needs

1200, 1500 or 1800 R.P.M. Constant Speed Motor A.C. or D.C.					900/1800 R.P.M. or 750/1500 R.P.M. Two Speed A.C. Motor				
A	B	C	D	E	F	G	H	J	K
3500	3000	2250	1500	1000	3500	3000	2250	1500	1000
2430	2080	1560	1040	695	2430	2080	1560	1040	695
905	775	580	385	260	1750	1500	1125	750	500
					1215	1040	780	520	345
					905	775	580	385	260
					450	385	290	190	130

Higher or lower speeds than listed above are available on special order.



New distinctive features which reduce mass production costs are found in this simplified high-speed Cincinnati Bickford 7½" diameter, 2½' arm Super Service Radial.

You save in power, floor space, and in initial investment. You get a machine, that gives the operator maximum ease and speed in handling.

The machine is sturdy, and will give continuous high production.

Write for Bulletin R-26A. It is completely illustrated and gives a complete description.

THE CINCINNATI BICKFORD TOOL CO.
RADIAL AND UPRIGHT DRILLING MACHINES
SUPER SERVICE

Radials 7½" dia. col., 2½' arm, to 26" dia. col., 12' arm.
General purpose Uprights, 21" to 28" sizes.
Production Uprights, 21" to 28".
Jig Borers, Portable Horizontals, Spacing Table Machines.

Equal Efficiency of Every Unit Makes the Balanced Machine

THE CINCINNATI BICKFORD TOOL CO. **Cincinnati 9. Ohio U.S.A.**

December 8, 1947

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT

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The finish on your product will take on a greater importance in the near future when the gap between supply and demand narrows down into a buyer's market. Now is the time to safeguard future sales volume by installing modern Finishing Equipment. Regardless of what your product is—railroad coaches, buses, automobiles, refrigerators, stoves, washers or the smallest radio cabinet—the Mahon organization stands ready to plan, engineer, build and install complete ultramodern equipment to handle your cleaning, rust proofing, drying, painting and baking operations efficiently and economically. Mahon Finishing Systems are in operation all over the world . . . twenty-seven years of experience and pioneering development, in this highly specialized field, have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File, or arrange consultation with Mahon engineers.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 23 DECEMBER 8, 1947

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MORGAN WORCESTER ROLLING MILLS

195

on the job* . . more on the way

A high percentage of the world's output of billets, rods, merchant shapes, strip and skelp is rolled on Morgan mills.

Morgan achieved preeminence in the field by introducing the first successful continuous rolling mill and has retained leadership through a steady stream of technical advancements.

No two Morgan Mills are exactly the same. Each was engineered to meet specific needs. Each fulfilled its purpose a little better than its predecessor.

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*This includes 15 mills of types not illustrated.

December 8, 1947

Department of Transportation?

Subcommittee of the Senate Commerce Committee has proposed a new Department of Transportation to be represented in the President's cabinet by a Secretary of Transportation. The new department would embrace the Interstate Commerce Commission, Civil Aeronautics Board and Civil Aeronautics Administration.

Ordinarily the average business man does not like the idea of expanding the executive branch of the government. There is ample evidence at hand to prove that the executive part of the federal government already is too large, too bureaucratic, too unwieldy and too inefficient. Nevertheless, it is possible that under certain conditions some agencies could be concentrated in a new department with results that would be beneficial all around.

Investigation might prove that this would be true in the case of the ICC, CAB, CAA and perhaps some lesser agencies and commissions dealing with transportation. At any rate, transportation is important enough in peacetime as well as in wartime to warrant more competent attention on the part of the federal government than has been given it in the past. Also there is greater need today than ever before for improved co-ordination of transportation systems. There are considerable differences in the attitude of the government toward railroads, air transport, highway transportation, inland waterway and ocean transportation and pipeline transmission. There is room for vast improvement in state regulations affecting various means of transportation.

Whether or not a separate executive department for transportation with a secretary in the cabinet would improve the position of transportation in our national economy is a timely subject for debate. We think it should be given careful consideration because some of the modes of transportation now are facing difficult postwar problems. The managements of these systems need a more sympathetic understanding of their problems on the part of Washington.

Also, it is well to remember that transportation is one of the first targets of those who are ever ready to foist nationalization upon our nation. The more satisfactorily the transportation systems can be operated privately under fair and intelligent federal regulations the more difficult it will be for crackpots to nationalize this important part of our economy.

* * *

THERE'S A DIFFERENCE: Everything that has happened since the President asked Congress to give him authority to reinstitute certain wartime controls to combat inflation points to the fact that there is more confusion than clarity in administration circles in Washington as to what controls actually are desired.

It is quite evident that some members of the cabinet were taken aback by the President's request. They really wanted a minimum of control. Now they are in the awkward position of asking for powers more sweeping than they think are practicable or necessary.

As for the contemplated controls on iron and steel products, steel producers who were consulted by administration officials last week advocated a voluntary allocation system. They pointed out that it will do the job effectively without interfering unduly with the existing routine of production and distribution. Anything approaching wartime compulsory controls would play havoc with the present pattern of production and distribution.

The most competent judges should be those industrialists who helped the government in administering wartime controls. Almost without

(OVER)

exception they favor voluntary allocation as the more practical way of meeting the present problem. They can see clearly the great difference between controlling the distribution of wartime products to government account and controlling the distribution of peacetime products to millions of consumer accounts. —pp. 59, 60

* * *

NEW MILL CAPACITY: Every few days some misinformed or malicious person charges that the American steel industry is deliberately trying to prolong the sellers' market in order to keep prices and profits at high levels. This ridiculous charge is predicated upon the critic's usually ignorant assumption that steelmakers are doing little if anything to increase capacity.

Actually steelmakers are working hard to increase capacity wherever it can be done effectively. The expansion program now under way involves expenditures totaling $448 million. Unfortunately much of the expansion undertaken many months ago has been delayed by strikes and other handicaps in the equipment industries. More than 3 million tons of new flat-rolled steel capacity scheduled for completion by mid-1947 will not be operative until well into 1948.

The list of mills now under construction is conclusive proof of eagerness to expand sensibly under trying conditions. —pp. 66, 67

* * *

BENEFICIAL RESEARCH: Recently the Navy Industrial Association held a conference on problems involved in industry's participation in research and development activities of the Navy. Discussion revealed that the metalworking industries are working closely with the Navy on a large number of projects of widely diversified character.

Now that guided missiles and long-range planes can go over the top of the world, the Navy is developing light and easily assembled Arctic huts, improved low-pour-point lubricants, cold motor starting kits, snow compaction equipment, improved ship-to-shore overhead tramways, machinery that can be knocked down for air transport and improved seaplane slips. Other new projects deal with the problems of launching and landing planes, control mechanisms for turbo-jet engines and alloys for use at elevated temperatures.

Industry's co-operation in this work is bound to result in experience that will be beneficial to civilian as well as military progress. —p. 71

SIGNS OF THE TIMES: By purchasing Empire Steel Corp. for $7,430,000, subject to approval of Empire stockholders, Studebaker Corp. (p. 63) joins the growing ranks of manufacturers and fabricators who have entered the steel business to insure a reliable source of steel. . . . The wire rope industry, which aided in the development of better wire rope for plane arresting gear on airplane carriers, now is working with the Navy on a further development (p. 71) which, if successful, will result in the first fundamental change in wire rope manufacture since preforming was invented. . . . Allis-Chalmers Mfg. Co., which this year is observing its 100th anniversary (p. 78), attributes its longevity to diversification of product. Diversification as a major company policy was introduced in 1861 by Edward P. Allis. Today the company manufactures more than 1600 products . . . British railroads will begin this winter with about 25,000 fewer freight cars (p. 72) than were in service at this time last year. . . . Boron can be substituted for several hundred times its own weight of any other alloying element used for enhancing hardenability. Bureau of Mines investigators report that calculations on the basis of an average multiplying factor of 1.58 reveal (p. 93)) that 0.003 per cent total boron in steel has an effect on hardenability equal to that of 0.87 silicon, 0.79 nickel, 0.27 chromium, 0.12 manganese or 0.23 molybdenum. . . . Chile's first integrated steel plant—construction, engineering and management of which will be supervised by Koppers Co., Inc. (p. 73)—will have a capacity of 250,000 tons of finished steel products annually and will consist of coke ovens, blast furnace, open-hearth, bessemer converter, electric furnace and finishing mills for flat-rolled and merchant products. . . United States Army experts have concluded that placing key industrial plants underground or moving plants from congested areas is not the answer to bombing and guided missile attacks in another war. The best answer now available (p. 68) is to prepare industry for immediate all-out production in event of another war so that our fighting forces will be able to nullify attacks. . . . Requirements for the successful use of 3-pass open-hearth checkerwork (p. 112) are ample chamber volume, short flame firing, minimum carryover and induced draft.

E. L. Shaner

EDITOR-IN-CHIEF

Inland's "Men of Steel"

These are typical steelmen who make your Inland steel. Competent, self-reliant, experienced men, they have devoted their lives to steelmaking. You'll find them everywhere in Inland's plants . . . on the ore docks . . . tapping blast furnaces . . . charging open hearths . . . supervising rolling operations . . . running tests in Inland laboratories. All are working to a common purpose . . . to produce steel of the highest quality—steels they can be proud of. It is men such as these . . . Inland's "men of steel" . . . who make the steel you can depend on.

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TUNE IN . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Sunday night. • METROPOLITAN OPERA broadcasts every Saturday afternoon.

Secretary of Commerce W. A. Harriman, left, is carrying the ball for the administration in attempting to put across new priority, allocation and price controls. Also contributing to the administration's program are Edwin G. Nourse, center, head of the President's Council of Economic Advisers, and Secretary of Agriculture Clinton P. Anderson. NEA photo

STEEL
December
8
1947

Industry Favors Voluntary Action

Co-operative allocations faster, more effective and less disrupting by control by law, steelmakers say. Administration's program for "limited" and "selective" control vague

VOLUNTARY allocations of steel for essential programs through industry - government co - operation would be faster, more effective and would cause fewer dislocations than the compulsory controls now being asked by the administration.

This in essence is the steel industry's reply to proposals by Secretary of Commerce W. A. Harriman that a federal agency be accorded limited priority and allocation powers over steel and certain other basic commodities.

The steel men, in a recent conference with Mr. Harriman in Washington, made clear their opposition to new compulsory allocation controls. They indicated such a system for steel at this time is unnecessary, ill-advised and impracticable. They believed federal intervention in steel distribution would disrupt the present system and wreak havoc with their customers, the metalworking industries accounting for 40 per cent of all industry.

Voluntary Action Demonstrated—Co-operative and voluntary channeling of steel into needed uses already has been demonstrated in the freight car program, steel men pointed out. They indicated willingness to apply this system to other programs deemed essential by the government.

The industry men pointed out that whereas under a co-operative voluntary program they could gather in Washington overnight and set up a program the next day, a compulsory control system would entail much delay. Not only would considerable time elapse before Congress made up its mind on what controls to authorize, but there would be further delay in setting up an organization to exercise such controls. Men formerly with OPA and WPB have estimated that as long as eight months would be required to get a new control system working after Congress had passed the necessary laws.

GOP Policy — The Republicans in Congress agree with industry that voluntary allocations, as well as voluntary agreements on prices and wages, are preferable to the controls by law asked by the administration. At a secret policy meeting last week, the GOP leaders were reported to have turned thumbs down on the President's request for compulsory price controls, rationing power and general allocations, although they will support the extension of export controls, transportation controls, and will give the government funds to work with industry for voluntary agreements on prices, allocations and wages.

Bills Are Drawn—Despite the objections of industry, the administration is continuing to press for allocations and price control. Two bills are being drawn up. One is a price and wage control act and the second is a two-year extension and broad-

ening of the second decontrol act of 1947. The latter would carry the allocation powers.

Secretary Harriman, after conferring with the steel executives, recommended "limited" price control and allocation authorization before two congressional committees — the Joint Committee on the Economic Report and the House Banking and Currency Committee.

Proposals Vague — Committee members found the scope and purpose of the desired controls somewhat vague.

"What is this limited authority you keep referring to?" asked Sen. Robert A. Taft (Rep., O.). "As I understand it, you want all-out authority, even though you may not use it."

Mr. Harriman explained: "We are asking authority for priority orders in areas of basic national interest, and only limitation orders in less essential areas."

Say Piecemeal Action Impracticable—Industry spokesmen do not believe it would be possible to put either allocation or price controls into effect piecemeal. Limited controls, they contend, would create stresses and strains in the economy which would make necessary more controls until the whole economy would become involved in a sort of chain reaction.

If compulsory allocations of steel are instituted, industry men foresee the application of tremendous pressures from all sides on the group assigning the priorities and allotments, and inequitable assignments of material among the various industries and to competing companies within the same industries.

Also included in the administration's program are proposals for wage controls, provided the upward trend in living costs can be arrested or reversed.

Ask New Wage Increases — Organized labor last week expressed "faint hope" that the latter can be accomplished. At the same time, President Philip Murray of the Congress of Industrial Organizations, formally announced that CIO unions will embark on a campaign for third round wage increases (as predicted in STEEL, Dec. 1, p. 59).

First major industry to be faced with the new pay demands will be the shipping industry whose maritime workers will ask for a new wage scale later this month. Major metalworking industries will face new wage increase demands from the electrical, automobile and steelworkers next March and April.

GIRL LIGHTS STACK: Eleven-year-old Donna Mae Yavorsky ignites Carnegie-Illinois Steel Corp.'s No. 4 blast furnace at Youngstown. Looking on are, left to right: Laurence S. Dahl, general superintendent of the Youngstown district works; B. F. Fairless, president of U. S. Steel Corp.; and John Yavorsky, Donna Mae's grandfather and a tuyereman for the corporation's Youngstown blast furnaces for the past 46 years

Steel Export Control Extended

THIRTY-SIX additional iron and steel products will be placed under export control Jan. 1, bringing under control 95 per cent of exports of steel mill products to all destinations except Canada, which is exempt. During the third quarter, less than 50 per cent of steel exports required validated licenses.

Export controls have been broadened to permit more effective supervision over the destination of shipments abroad and their end use, according to the Office of International Trade, Department of Commerce. The action was taken because of the continued domestic shortages of steel products.

Products which have been added to the controlled list follow: Plates, alloy and fabricated; structural shapes, unfabricated, fabricated and unlined storage tanks; sheet piling and skelp; rails, all weights, relaying rails, rail joints and splice bars; carbon and alloy steel ingots, blooms, billets; bars, hot-rolled and cold-finished carbon over 1 in., alloy and iron bars;

Sheets, ungalvanized carbon, 0.40 per cent carbon and over, and ungalvanized alloy steel; cold-rolled strip, 0.40 per cent carbon and over, carbon hoop, band and scroll; hot-rolled strip, 0.40 per cent carbon and over and carbon hoop band and scroll;

Pipe and tubing, seamless boiler tubes, welded boiler tubes, iron and steel pipe not elsewhere specified; wire, galvanized, barbed, baling, cold-finished coils, musical instrument, piano, bright steel spring wire for musical instruments; railroad specialties, car wheels, car axles, and axles with wheels; forgings, carbon and alloy.

Chicago Steel Rates to Wisconsin Alleged Unfair

Following allegation by the Great Lakes Steel Corp., Detroit, that freight rates on iron and steel products to Milwaukee and other Wisconsin cities from the Chicago district were preferential to Chicago mills by from 3 to 6½ cents per cwt, Interstate Commerce Commission Examiner John A. Russell has recommended that the complaint be dismissed.

Intervening parties against the steel company's charges included the Wisconsin Manufacturers Association, Milwaukee Iron & Steel Traffic Committee, A. O. Smith Corp. and Green Bay Association of Commerce. It was estimated that if the complaint is upheld by the ICC, where the case has been referred by the examiner, additional freight costs to users in Wisconsin would be about $1 million on the 1 million tons of iron and steel which is consumed in the state during the course of each year.

Foundrymen Discuss Tight Iron Supplies

WHILE looking for little early improvement in the merchant pig iron situation, J. A. Claussen, representative, Committee on Merchant Pig Iron, American Iron & Steel Institute, New York, said in Newark, N. J., recently that supply and demand are not far from being in balance.

Actually, he said, output of two more furnaces in addition to present output, plus the Lone Star Steel Co.'s stack at Daingerfield, Tex., and the War Assets Administration stack at Gadsden, Ala., would go far in bringing supply and demand into balance. The Daingerfield furnace recently began operation and the Gadsden furnace should be in production within a few months, both contributing eventually a total of 50,000 tons per month.

Coke Is Factor — Speaking before the New Jersey Foundrymen's Association, he pointed out balance also could be reached if blast furnaces were only to overcome the present loss of 10 to 12 per cent in production due to the poor quality of coke resulting in turn from the inferior quality of coal available.

A substantial portion of current coal shipments abroad has been of the metallurgical grades. The government has initiated steps to limit exports of metallurgical coal to minimum needs and this in time will help to some extent. Also, coal washing equipment is being installed at various plants to improve coke quality and this eventually will be reflected in better output of merchant pig iron.

Not Encouraging — However, the outlook for the coming winter and

(*Please turn to Page* 162)

Present, Past and Pending

■ FORD SIGNS UP 88 CALIFORNIA SUPPLIERS
LOS ANGELES—Ford Motor Co. has signed contracts with 88 partsmakers in this state in furtherance of a $60 million procurement program for its West Coast assembly plants.

■ AFA STEEL DIVISION LAUNCHES RESEARCH PROJECT
CHICAGO—Study of the influence of mold conditions on the development of hot tears in steel castings will be the first research project to be sponsored by the Steel Division of the American Foundrymen's Association. Clyde Wyman, metallurgist for Burnside Steel Foundry Co., is chairman of the research committee.

■ WHEELING STEEL ORDERS NEW PIPE MILL
WARREN, O.—Wheeling Steel Corp., Wheeling, W. Va., has ordered a high-speed butt-weld pipe mill from Aetna-Standard Engineering Co. Mill will have a maximum capacity of 1000 ft a minute.

■ TIMKEN TO EXPAND THREE OHIO PLANTS
CANTON, O.—Timken Roller Bearing Co. will expand its plants at Zanesville, Wooster and Mt. Vernon, all in Ohio, according to President W. E. Umstattd.

■ RAILROADS RAISE RATE INCREASE REQUEST TO 30%
WASHINGTON—Railroads have asked the Interstate Commerce Commission to increase their freight rate by nearly 30 per cent over the level in effect last summer. This is 3 per cent more than asked in an earlier petition.

■ GREAT WESTERN TO PURCHASE 26 DIESELS
CHICAGO—An expanded dieselization program for the Chicago & Great Western Railway was revealed with the authorization of purchase of 26 new diesel units.

Pig Iron Production Rises To New Peacetime High

Blast furnaces operated at 93.6 per cent of capacity in October, lifting production to a peacetime high of 5,227,747 tons and to a level only 3 per cent under the all-time high of 5,439,240 tons established in March, 1944.

Operating at 89.6 per cent during the first 10 months, the furnaces produced 49,015,341 tons in that period, exceeding the total for any peacetime year, including 1946 when output was 45,318,494 tons.

Of the October total, 5,163,702 tons were pig iron and 64,045 tons ferroalloys while in the 10-month period 48,471,731 tons were pig iron and 543,610 tons ferroalloys, according to the American Iron & Steel Institute, New York.

The Pittsburgh-Youngstown district operated at 98.2 per cent in October while the Cleveland-Detroit district operated at 93.2 per cent and the Chicago district at 92.3 per cent.

PRODUCTION OF PIG IRON FOR OCTOBER AND YEAR TO DATE

Blast Furnace Capacity and Production—Net Tons — OCTOBER – 1947

	Number of companies	Annual blast furnace capacity	Production: Pig Iron — Current month	Pig Iron — Year to date	Ferro Manganese and Spiegel — Current Month	Ferro Manganese and Spiegel — Year to date	Total — Current month	Total — Year to date	Percent of capacity — Current month	Percent of capacity — Year to date
DISTRIBUTION BY DISTRICTS:										
Eastern	11	12,551,280	925,384	9,033,562	29,206	269,865	954,590	9,303,427	89.5	89.0
Pittsburgh-Youngstown	17	25,042,040	2,069,821	19,022,276	20,236	163,009	2,090,057	19,185,285	98.2	92.0
Cleveland-Detroit	6	6,557,500	519,191	4,861,749	-	-	519,191	4,861,749	93.2	89.0
Chicago	7	14,097,710	1,102,701	10,459,492	2,373	2,373	1,105,074	10,461,865	92.3	89.1
Southern	8	4,924,670	353,116	3,243,682	12,230	97,066	365,346	3,340,748	87.3	81.4
Western	4	2,536,000	193,489	1,850,970	-	11,297	193,489	1,862,267	89.8	88.2
TOTAL	37	65,709,200	5,163,702	48,471,731	64,045	543,610	5,227,747	49,015,341	93.6	89.6

Engineers' Burden Grows

Advent of atomic energy makes it necessary for them to supply leadership as well as technical contributions, they are told at annual ASME convention

ATLANTIC CITY—For the third time in its 68-year history, the American Society of Mechanical Engineers has held an annual meeting away from its headquarters in New York. Because of hotel conditions there, Chalfonte-Haddon Hall was selected as locale for the 1937 national meeting, which drew attendance of more than 1500 throughout the week of Dec. 1.

One of the highlights of the meeting was the address by David Lilienthal, chairman, U. S. Atomic Energy Commission, at the Tuesday luncheon, attended by more than 600.

Dramatic Event—"Five years ago today," said Mr. Lilienthal, "there occurred mid deepest secrecy an event of such dramatic significance that it immediately placed its imprint upon the lives and future prospects of every human being on earth."

After comparing the discovery and potentialities of atomic energy to that of fire, the speaker went on to say it will be a national catastrophe if through lack of informed public opinion America's atomic enterprise now should fall prey to ignorance, panic, indifference or petty politics.

Who Can Supply Leadership?—As recognized enemies of error, who, better than America's engineers, can supply leadership in public education necessary to continued vigorous, competent development in the field of atomic energy, he concluded.

The size and scope of this 68th annual meeting of the society is indicated by the fact that it involved 90 sessions at which papers prepared by 317 authors were delivered and discussed. These ranged all the way from modern machine shop practice to rocket and jet propulsion and power plant applications of nuclear energy. Throughout the meeting ran a strong theme of economy in manufacturing operations, in use of materials, in use of time of men and machines, in products design, in handling of material and in marketing of finished products. In other words, one sensed strong realization that America no longer is a land of unlimited natural resources, and that in order to keep on making more and better things for more people and more and better jobs for more people—and at the same time maintaining national strength in the face of a badly disorganized world—American industry henceforth must set far higher standards of manual, material, mechanical, managerial and marketing efficiency than it ever has had in its history.

Research Involved — Engineering and scientific methods of research are deeply involved in this composite picture of America's future, which is a heavy responsibility to rest on the shoulders of the 275,000 engineers in this country.

New president of ASME, who was introduced at the annual banquet Dec. 3, is E. G. Bailey, vice president and director, Babcock & Wilcox Co., New York, and founder of Bailey Meter Co., Cleveland.

New regional vice presidents are: Frank M. Gunky, associate, Charles T. Main Inc., Boston; Paul B. Eaton, head of department of mechanical engineering, Lafayette College, Easton, Pa.; Thomas E. Purcell, general superintendent of power stations, Duquesne Light Co., Pittsburgh; and J. Calvin Rown, Los Angeles.

One unusual feature of this meeting was the inclusion of exhibits covering the following: Nuclear energy; gas turbines; jet propulsion; basic economic truths; and the graphite arts. These exhibits, which were assembled for ASME under the management of Captain E. Henning, U. S. Navy (ret.), include actual equipment from Wright Field and elsewhere; animated exhibits from the Atomic Energy Commission; three-dimensional dynamic graphics analyzing the break-even point and economic profit developed by James D. Mooney, president, Willys-Overland Motors, Toledo, in collaboration with Walter Fried, consulting engineer, Technical Managers Inc., New York. These utilize actual flowing liquids to illustrate flow of goods and money in our economic system.

E. G. BAILEY

Calendar of Meetings . . .

Dec. 8, Pressed Metal Institute: Toledo District meeting, Elks Club, Toledo, O.

Dec. 8-13, Automotive Service Industries Show: Navy Pier, Chicago.

Dec. 10, Pressed Metal Institute: Indiana District meeting, Antlers Hotel, Indianapolis.

Dec. 15, Pressed Metal Institute: New York State District meeting, Sheraton Hotel, Buffalo.

Dec. 15-16, American Management Association: Conference to discuss production costs at Hotel Pennsylvania, New York. Association headquarters are at 330 W. 42nd St., New York.

Dec. 15-18, National Auto Wreckers Association: Fifth annual replacement parts convention, Hotel Sherman, Chicago. Association president is Max Rappaport, 624 S. Michigan Ave., Chicago.

Dec. 26-31, American Association for Advancement of Science: Annual meeting, Stevens and Sherman Hotels, Chicago.

Jan. 8, American Supply & Machinery Manufacturers Association and National and Southern Supply & Machinery Distributors' Associations: Joint regional meeting, Edgewater Gulf Hotel, Biloxi, Miss.

Jan. 12-13, Industrial Furnace Manufacturers Association: Mid-winter meeting at Hotel Schenley, Pittsburgh. Association headquarters are at 420 Lexington Ave., New York.

Jan. 12-16, Second National Materials Handling Exposition: Public Auditorium, Cleveland.

Jan. 13-14, American Society of Mechanical Engineers: Special national session of materials handling and management divisions in conjunction with Materials Handling Show. Meeting headquarters will be at Hotel Statler, Cleveland.

Jan. 14, American Supply & Machinery Manufacturers' Association and National Supply & Machinery Distributors' Association: Joint regional meeting, Copley Plaza, Boston.

Jan. 19-29, Institute of Scrap Iron & Steel Inc.: 1948 convention, Congress Hotel, Chicago. Institute executive secretary is Edwin C. Barringer, Normandy Bldg., Washington.

Jan. 21-24, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York.

Jan. 26-28, American Road Builders' Association: 45th annual convention, Washington, D. C. Association headquarters are in the International Bldg., Washington.

Jan. 26-29, Refrigeration Equipment Manufacturers Association: 5th all-industry refrigeration and air conditioning exposition, Cleveland.

Jan. 26-30, American Standards Association: Seminar on standardization work and writing of standard specifications at Engineering Societies Bldg., New York.

Steel Plant May Be Sold To Studebaker

NEGOTIATIONS to sell Empire Steel Corp., Mansfield, O., to Studebaker Corp., South Bend, Ind., mark another step in the movement of steel consumers to assure themselves an adequate supply of steel by acquiring nonintegrated steel producing facilities. (See STEEL, Sept. 22, p. 48)

Sale of Empire for $7,430,000 was voted last week by the company's directors, and stockholders are to meet Dec. 19 to act on the sale. If approved, the sale is expected to be effected about Dec. 31.

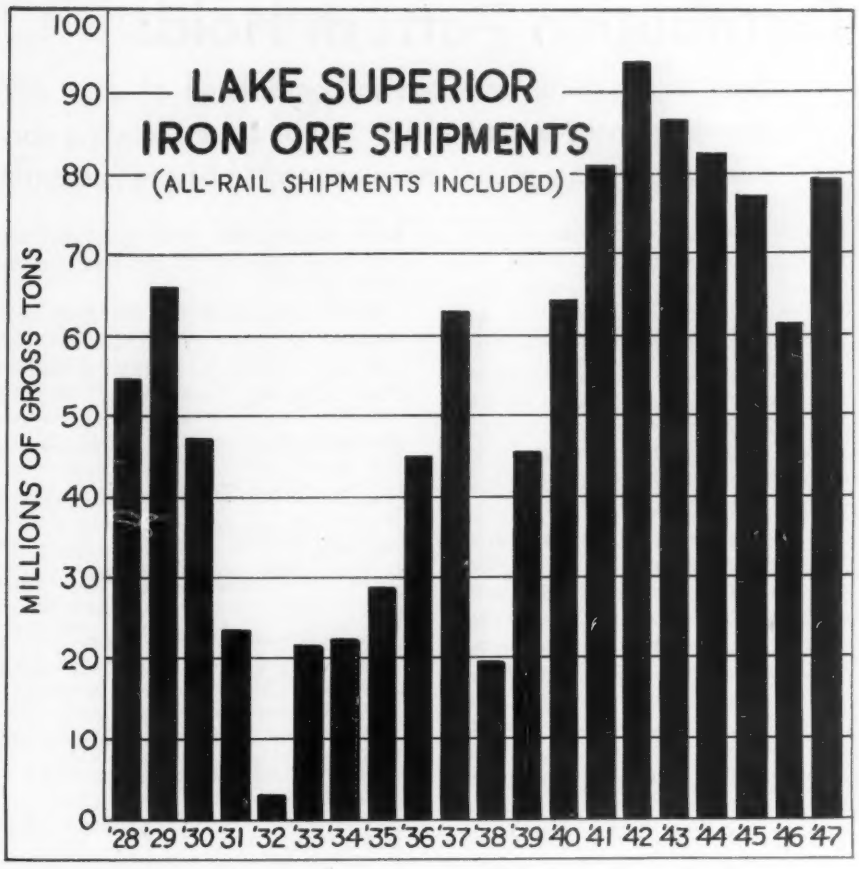
Empire has annual capacity of 348,540 net tons of basic open hearth ingots, 120,000 net tons of hot-rolled sheets and 14,400 net tons of long ternes. It has six basic open hearths, one 32-in. blooming mill, one 24-in. sheet bar mill, and 14 sheet finishing mills (four breakdown, three finishing, and seven cold flattening), along with 13 sheet mill heating furnaces, 29 annealing furnaces, one normalizing furnace, four pickling machines, and one long terne pot.

Products of the company have been steel ingots and sheet bars; hot-rolled, hot-rolled pickled, special black, electrical and long terne sheets.

Supply Assured—Purchase would provide Studebaker with a full supply of steel for Studebaker's expanding passenger car and truck production. Studebaker plans to operate Empire Steel as a wholly-owned subsidiary under direction of its present management. Steps to acquire the steel company constitute the latest move in Studebaker's postwar expansion program that has added more than a million square feet of floor space to the auto builder's productive facilities.

Commenting on the proposed purchase of the steel company, H. S. Vance, chairman of Studebaker Corp., said his company does not propose to absorb Empire's entire output. "In fact for the next few months our requirements can be met by taking only a small portion of the company's production. We propose to take care of our needs in such fashion as to cause the least disturbance possible to Empire's present customers."

The acquisition would assure maintenance of Studebaker's present production of 20,000 units a month.



Will Ore Stocks Be Adequate?

Lake movement of nearly 78 million tons easily sets peacetime record, but blast furnace operators fear shortage before next shipping season opens

NOVEMBER freeze at the upper lake ore-loading ports and mines and stormy weather on the Great Lakes slowed lake ore shipments and held the total movement for the season just ended to slightly under 78 million tons. With all-rail shipments estimated at 1.7 million tons, the total of Lake Superior ore brought down this year is about 79.5 million tons.

While this is more than 12 million tons greater than any previous peacetime year's movement, it likely will fall short of the year's consumption. Prospects are that ore supplies will be uncomfortably tight before the next shipping season opens, probably next April.

November lake shipments were only 5,877,006 tons, against a hoped-for 8 million tons and an actual movement of 6,701,305 tons in November, 1946. The primary cause for the low movement in November was frozen ore and at times as many as 40 freighters were waiting, some for as long as four or five days, at upper lake loading docks, while shippers struggled with the frozen ore.

At the beginning of December, ore stocks at lower lake ports and furnaces approximated 41 million tons. This must carry blast furnaces depending on Lake Superior ore through to opening of the next shipping season, or about May 1.

Consumption of Lake Superior ore during the first ten months this year totaled 66,667,685 tons. At this rate, requirements for the next five months will be between 33 and 34 million tons, indicating a carryover of only 7 to 8 million tons on May 1. This would be by far the lowest ore carryover ever experienced, the lowest to date being 14.6 million tons in the spring of 1937.

The 7 to 8 million ton carryover indicated will include all stocks of all grades at all furnaces and docks. It is expected that some furnaces will run short of needed grades during March and April, necessitating either swaps or purchases from more fortunately stocked furnace operators. Should the shortage become as acute as some operators fear, there is a possibility that winter all-rail shipments will be made.

Distribution Pattern Holds

Only slight shifts revealed in comparison of steel mill shipments in 1946 and 1947. Automakers, leading consumers, get 1.5 per cent more on total in first nine months

FINISHED steel shipments to metalworking industries and other mill outlets in September followed closely the pattern that has held with minor variations since the war's end.

The automotive industry again was No. 1 consuming industry. Construction and maintenance continued in second place, with containers and the railroads in third and fourth positions, respectively.

A comparison of shipments for the first nine months of 1947 and for the year 1946 (see chart) shows this pattern has prevailed through both years. Some slight shifts in the percentages of total output received by the various outlets, however, is noted.

In 1946, the automotive industry received 12.5 per cent of all steel shipped. For the first nine months this year, automakers have been getting 14 per cent of the total.

Warehouse distributors obtained 19 per cent of the total output in 1946, but this year are receiving 16.7 per cent.

Exports, which took 6.2 per cent of mill shipments in 1946 are taking 6.6 per cent this year.

Oil and gas drilling are receiving more than double their 1946 percentage, having received 0.6 per cent last year and 1.4 per cent of the total this year. In tons, shipments for nine months this year total 670,556 net tons, against 316,366 tons for all of 1946.

Total shipments for the first nine months of 1947 of 46,520,224 tons are only a little more than 2 million tons under the year's total for 1946 of 48,775,532 tons shipped.

In September, the automotive industry received slightly more than its year's average with 14.2 per cent of the month's total shipments. Construction held its average of 9.8, containers did slightly better with 8.1 per cent against 8.0 for the year, and railroads dropped from 7.8 per cent for the year to 7.3 for September. September export shipments were 6.3 per cent, slightly lower than the average for the first three quarters of 6.6 per cent.

Steel Distribution, 9 Months, 1947

(Leading products, all grades including stainless)

Market Classification	Net Total (All Products) In Net Tons
Converting and Processing	4,202,395
Jobbers, Dealers, Distributors	7,753,587
Construction, Maintenance	4,582,501
Contractors' Products	1,665,376
Automotive, excl. Tractors	6,512,788
Rail Transportation	3,624,296
Shipbuilding	234,676
Aircraft	29,943
Oil, Gas Drilling	670,556
Mining, Quarrying, Lumbering	212,132
Agricultural	903,167
Machinery, Industrial Equip., Tools	2,342,881
Elect. Machinery, Equip.	1,176,389
Appliances, Utensils, Cutlery	1,159,321
Other Domestic, Commercial Equip.	1,235,136
Containers	3,755,851
Ordnance, other military	33,207
Unclassified	3,350,119
Export	3,075,903
Total	46,520,224

Steel Mill Operations in Midwest Exceed 100%

Steel mills in the Pittsburgh-Youngstown and Cleveland-Detroit districts operated at over 100 per cent of rated capacity during October, producing 3,121,006 tons and 635,210 tons, respectively, according to the American Iron & Steel Institute.

The respective totals for the first ten months of this year for these districts were 28,498,574 and 5,906,967 tons.

The report also revealed that high rates were maintained in other districts in October, being 95.6 per cent in the South, 95.4 per cent in the East, 94.6 per cent in Chicago, and 92 per cent in the West, making the October national rate 97.5 per cent compared with 92.3 per cent for the first 10 months.

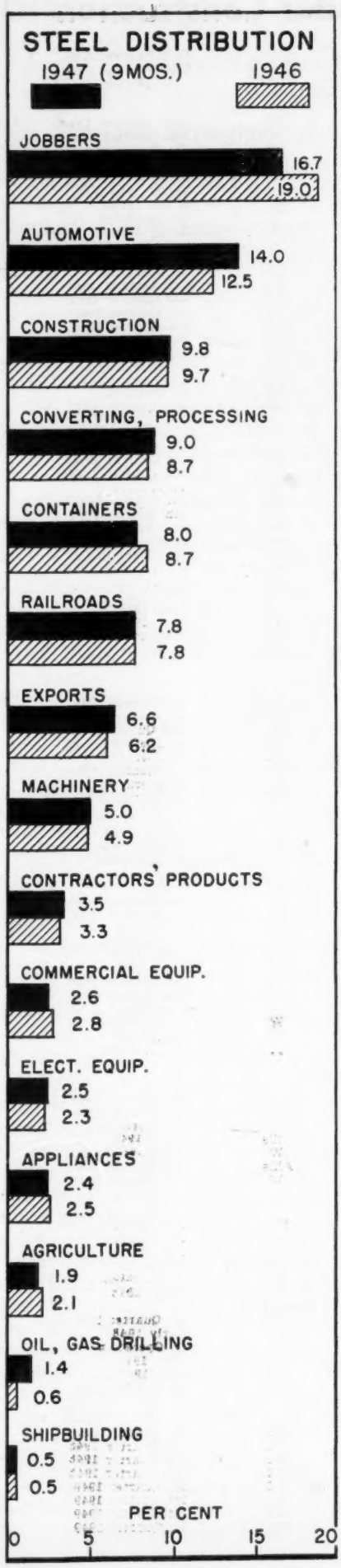
Total steel output, including alloy steel, totaled 7,560,365 tons in October and 70,184,900 for the first ten months.

Distribution of Steel Products—September, 1947

(In net tons of leading products of all grades, including alloy and stainless)

Market Classification	Shapes	Plates	Hot-Rolled Bars	Cold-Finished Bars	Seamless Tubing	Drawn Wire	Hot-Rolled Sheets	Cold-Rolled Sheets	Coated Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Total (All Products)
Converting and Processing	5,965	44,154	186,594	12,903	10,848	95,059	75,272	3,492	1,081	37,071	6,359	922,463
Jobbers, Dealers, Distributors	80,597	74,927	90,449	31,657	63,535	19,179	67,173	35,958	35,222	10,082	2,993	862,400
Construction, Maintenance	139,838	127,552	30,691	229	26,388	2,547	30,275	2,871	7,717	6,232	2,166	501,926
Contractors' Products	1,074	13,152	12,586	917	2,537	3,413	49,575	30,463	39,966	6,590	5,986	184,795
Automotive, excl. Tractors	4,344	29,836	129,084	21,060	1,082	22,896	188,227	227,853	7,978	39,768	25,440	726,952
Rail Transportation	44,808	69,806	31,894	550	246	236	23,798	2,805	5,439	2,738	193	374,303
Shipbuilding	3,386	15,107	1,286	244	119	89	1,082	315	245	4	....	22,786
Aircraft	....	179	208	427	188	147	101	88	29	28	137	1,862
Oil, Gas Drilling	2,784	7,904	6,884	515	32,864	71	2,678	213	24	184	....	75,122
Mining, Quarrying, Lumbering	1,839	2,992	5,058	123	1,294	408	1,681	217	126	354	1	26,795
Agricultural	5,498	7,922	40,964	6,193	112	3,184	13,785	3,257	7,144	7,612	406	104,028
Machinery, Industrial Equip., Tools	17,497	53,265	54,106	23,323	7,992	8,497	22,538	6,949	1,376	9,074	5,596	234,456
Elect. Machinery, Equip.	2,895	13,089	5,961	3,832	230	4,545	20,172	9,603	3,184	5,904	3,603	128,099
Appliances, Utensils, Cutlery	59	908	1,372	3,524	177	3,416	34,051	41,717	9,242	3,276	7,403	127,310
Other Domestic, Commercial Equip.	1,409	9,354	6,051	3,438	1	20,865	21,240	31,260	5,098	7,744	14,724	132,992
Containers	54	4,609	1,988	6	255	8,965	55,495	29,279	5,028	16,716	9,376	416,382
Ordnance, Other Military	48	296	978	254	....	262	63	10	....	5	....	8,668
Unclassified	16,676	....	41,231	9,082	12,744	33,098	32,127	5,561	1,092	9,487	40,834	365,043
Export	31,171	37,738	34,517	5,048	12,342	7,099	15,045	9,653	5,119	7,744	2,296	324,480
Total	359,942	512,790	681,902	123,325	172,954	233,976	654,378	441,564	135,110	170,608	127,513	5,540,862
* Less shipments to members of industry for conversion	428	18,089	61,176	953	10,389	13,968	51,431	2,383	223	28,961	2,060	422,023
Net Total	359,514	494,701	620,726	122,372	162,565	220,008	602,947	439,181	134,887	141,647	125,453	5,118,839

* All of these shipments were made to the group classified as "Converting and Processing."



Critical Study Promised for Control Plan

DECLARING that such peacetime powers as President Truman seeks for rationing supplies and fixing prices and wages could mean the end of America's historic freedoms, Joseph W. Martin Jr., speaker of the House of Representatives, assured the nation's business and industrial leaders in New York last week that Congress was going to examine proposals most carefully before committing the nation to any such program.

He described the president's request as the gravest demand ever made upon a country in peacetime and asserted that no man, bureau, clique or party in Washington can run America as well as the people themselves.

Representative Martin spoke at the 52nd annual Congress of American Industry, sponsored by National Association of Manufacturers. Approximately 3000 were present, with sessions given over to a survey of world problems affecting industry. The theme of the meeting was "A new world at home and abroad challenges industry."

Program Broad — Among specific matters discussed were legislative prospects, price controls, taxation, government spending, federal budget, labor-management problems, inflation, industrial research and other topics.

Running from Dec. 3 to 5 inclusive, the convention was concluded with the annual dinner at which Charles E. Wilson, president, General Motors Corp., was the principal speaker.

Clarence B. Randall, NAM national vice president, and vice president of Inland Steel Co., Chicago, said that "the obvious challenge to American industry is to continue to demonstrate to all the world that our system of free competitive enterprise serves mankind better than any other."

To accomplish this demonstration, he suggested that there must first be understanding. "We must know what is going on in the world. We must have complete knowledge as to the objectives of the opposing systems (as now set up) and of the methods they employ."

Looks To U. S.—Cyrus S. Ching, director of the newly created Federal Mediation & Conciliation Board, said that the world today looks to the industrial leadership of the United States for material to tide it over until it has adjusted to a state of self-sufficiency, and that both labor and management have equal responsibility in avoiding production stoppages.

Not Mobilizing Industry — Discussing the newly created Munitions Board of which he is chairman, Thomas J. Hargrave, president, Eastman Kodak Co., Rochester, N. Y., said there is a false notion today the board is mobilizing industry. "No such thing is occurring," he explained. "We are merely planning so that industry can and will be mobilized at the earliest possible moment in case of an emergency."

Critical material needs, he said, vary with changes in weapons and the list is constantly revised.

Presents NAM Platform — Harold Bunting, president of the association and president, O'Sullivan Rubber Corp., Winchester, Va., presented an NAM platform dealing with government fiscal policies and directed at excessive government spending.

The association, Mr. Bunting declared, regards the country's problem as three-fold: (A) To reduce inflationary pressures on prices in this country, thereby making it possible—(B) To maintain the standard of living of the American public, thus insuring the country's ability—(C) To provide the necessary aid to foreign nations. The twelve points he enumerated, he thought, were fair and valid answers to these problems.

The program calls for a reduction in government spending and a federal budget of $31 billion; income tax cuts ranging from 37 to 60 per cent; plan for paying off the national debt in 60 years at the rate of $2,500,000,000 a year; new long-term government bond issues paying enough interest to attract investors; foreign relief in the form of goods rather than dollars, and this to be distributed by American agencies; financing of foreign loans through the World Bank; establishment of sound currencies in foreign countries; elimination of controls on bank interest rates.

Industrial Relations — Discussing good industrial relations, Charles J. Stilwell, president, Warner & Swasey Co., Cleveland, said it was management's responsibility to keep employees informed and interested in their joint endeavor. "The greatest cause of the gulf between management and workers," he said, "is that we haven't told them enough about their jobs and the place their work has in the whole mechanism of business."

Rolling Mills Recently Completed or Under Construction

Company	Location	Type of Mill	Drive	Date Completed or Scheduled for completion
Continuous Cold Reduction Strip Mills				
Acme Steel	Riverdale, Ill.	26" 5-Stand Tandem	W	2nd Quarter 1948
American Rolling Mill	Butler, Pa.	54" 5-Stand Tandem	W	4th Quarter 1947
*Bethlehem Steel	Lackawanna, N. Y.	54" 4-Stand Tandem	W	In Operation
Bethlehem Steel	Sparrows Pt., Md.	56" 4-Stand Tandem	W	In Operation
*Carnegie Illinois	Gary, Ind.	42" 5-Stand Tandem	W	Late 1947
*Carnegie Illinois	Gary, Ind.	42" 5-Stand Tandem	W	Early 1948
Crucible Steel	Midland, Pa.	54" 3-Stand Tandem	W	Middle 1948
*Great Lakes Steel	Detroit	54" 3-Stand Tandem	W	In Operation
Steel Co. of Canada	Hamilton, Ont.	54" 5-Stand Tandem	W	Early 1948
Tennessee Coal, Iron	Fairfield, Ala.	54" 4-Stand Tandem	W	3rd Quarter 1948
Weirton Steel	Weirton, W. Va.	42" 5-Stand Tandem	W	In Operation
Allegheny Ludlum	W. Leechburg, Pa.	28" 4-Stand Tandem	GE	In Operation
Carnegie Illinois	Gary, Ind.	54" 4-Stand Tandem	GE	2nd Quarter 1948
*Carnegie Illinois	Gary, Ind.	84" 3-Stand Tandem	GE	4th Quarter 1948
Columbia Steel	Pittsburg, Calif.	56" 5-Stand Tandem	GE	1st Quarter 1948
Great Lakes Steel	Detroit	93" 3-Stand Tandem	GE	1st Quarter 1948
*Great Lakes Steel	Detroit	93" 3-Stand Tandem	GE	4th Quarter 1947
*Inland Steel	Indiana Harbor, Ind.	42" 5-Stand Tandem	GE	4th Quarter 1948
Jones & Laughlin	Aliquippa, Pa.	42" 5-Stand Tandem	GE	In Operation
*Tennessee Coal, Iron	Birmingham	42" 5-Stand Tandem—1 motor	GE	In Operation
*Tennessee Coal, Iron	Birmingham	42" 5-Stand Tandem—1 motor	GE	In Operation
Granite City	Granite City, Ill.	56" 4-Stand Tandem	Allis	4th Quarter 1947
Reversing Cold Strip Mills				
Detroit Steel Co.	New Haven, Conn.	24" Rev. Cold Strip Mill	GE	1st Quarter 1949
Republic Steel	Massillon, O.	25" Sendzimir Cold Strip	GE	3rd Quarter 1948
Thompson Wire Co.	Boston, Mass.	Sendzimir Cold Strip	GE	.....
Thompson Wire Co.	Franklin Pk., Ill.	Montgomery "Y" Mill	GE	1st Quarter 1948
Sharon Steel Corp.	Sharon, Pa.	29" Rev. Cold Strip Mill	GE	4th Quarter 1947
McLouth Steel Co.	Detroit, Mich.	28" Reversing Mill	GE	In Operation
McLouth Steel Co.	Detroit, Mich.	20" Reversing Mill	GE	In Operation
*Wallingford Steel	Wallingford, Conn.	29" Reversing Mill	GE	In Operation
Crucible Steel	Jersey City, N. J.	Reversing Cold Strip	GE	.....
Crucible Steel	Jersey City, N. J.	Reversing Cold Strip	GE	.....
American Rolling Mill	Butler, Pa.	40" Sendzimir Cold Strip	W	Late 1947
Republic Steel	Massillon, O.	66" Rev. Cold Strip Mill	W	Late 1947
Republic Steel	Massillon, O.	54" Rev. Cold Strip Mill	W	Late 1947
Kaiser Co.	Fontana, Calif.	24" Rev. Cold Strip Mill	W	4th Quarter 1947
Crucible Steel	Midland, Pa.	54" Rev. Cold Strip Mill	W	Middle 1948
Hot Strip Mills				
Bethlehem Steel	Sparrows Pt., Md.	68" Cont. Hot Strip	Allis	1st Quarter 1948
Crucible Steel	Midland, Pa.	Rev. Hot Strip	GE	4th Quarter 1948
Geneva Steel	Geneva, Utah	2-Stand Addition	GE	2nd Quarter 1948
Inland Steel	East Chicago, Ind.	76" Hot Strip—1 Drive	GE	In Operation
Republic Steel	Youngstown	48" Hot Strip	GE	In Operation
*Sharon Steel Corp.	Sharon, Pa.	14" Continuous Hot Strip	GE	3rd Quarter 1948
Tennessee Coal, Iron	Fairfield, Ala.	2-Stand Addition	GE	In Operation
*Wheeling Steel Corp.	Steubenville, O.	60" Hot Mill	GE	In Operation
Skin or Temper Pass Mills				
Bethlehem Steel	Sparrows Pt., Md.	56" Temper Mill (Coils)	W	In Operation
Bethlehem Steel	Sparrows Pt., Md.	56" Temper Mill (Sheets)	W	In Operation
Bethlehem Steel	Sparrows Pt., Md.	32" Temper Mill	Allis	Late 1947
Bethlehem Steel	Sparrows Pt., Md.	2-Stand Temper Mill	GE	In Operation
American Rolling Mill	Butler, Pa.	54" Temper & Cold Reduction Mill	GE	4th Quarter 1948
Detroit Steel	New Haven, Conn.	26" Temper Mill	GE	1st Quarter 1949
*Republic Steel	Niles, O.	Unitemper Mill	GE	.....
Carnegie Illinois	Gary, Ind.	84" Temper Mill	W	In Operation
Columbia Steel	Pittsburg, Calif.	42" Temper Mill	Allis	Early 1948
Columbia Steel	Pittsburg, Calif.	60" Temper Mill	Allis	Early 1948
Inland Steel	Indiana Harbor, Ind.	72" Temper Mill	Allis	2nd Quarter 1948
Inland Steel	Indiana Harbor, Ind.	54" Temper Mill	Allis	2nd Quarter 1948
Jones & Laughlin	Cleveland	54" Temper Mill	W	Late 1947
Weirton Steel	Weirton, W. Va.	54" Temper Mill	W	In Operation
Youngstown Sheet, Tube	Indiana Harbor, Ind.	42" Temper Mill	W	Early 1949
**Ford Motor Co.	Dearborn, Mich.	84" Skin Pass	**	March 1948
Reversing, Blooming, Slabbing, Bar and Billet Mills				
Crucible Steel	Midland, Pa.	Edger on Universal Mill	GE	4th Quarter 1948
Allegheny Ludlum	Brackenridge, Pa.	40" Blooming & Slabbing Mill	GE	1st Quarter 1949
A. M. Byers	Economy, Pa.	26" Blooming Mill	GE	In Operation
Bethlehem Steel	Los Angeles	32" Blooming Mill	Allis	Early 1948
National Tube	Lorain, Ohio	46" Blooming Mill	W	2nd Quarter 1948
National Tube	Lorain, Ohio	35" Bar Mill	Allis	2nd Quarter 1948
Wheeling Steel	Wheeling, W. Va.	36" Blooming Mill	W	3rd Quarter 1948
Bar, Rod and Billet Mills (Continuous)				
*Keystone Steel & Wire	Peoria, Ill.	10" Rod Mill—1 Motor	GE	.....
*American Steel & Wire	Joliet, Ill.	Rod Mill—1 Motor	GE	.....
*American Steel & Wire	Joliet, Ill.	Rod Mill—1 Motor	GE	.....
Crucible Steel	Midland, Pa.	Billet Mill	GE	In Operation
Bethlehem Steel	Lackawanna, N. Y.	10" Bar Mill	GE	In Operation
Bethlehem Steel	Los Angeles	12" Merchant Bar	Crocker Wheeler	Early 1948
Crucible Steel	Midland, Pa.	24" 6-Stand Rod	GE	1st Quarter 1948
Laclede Steel	Alton, Ill.	10" Morgan Rod Mill	W	Early 1948
Latrobe Electric	Latrobe, Pa.	Bar Mill	W	In Operation
National Tube	Lorain, Ohio	20" Continuous Billet	Allis	Late 1948
National Tube	Lorain, Ohio	26" Continuous Billet	Allis	Late 1948
Sheffield Steel	Kansas City, Mo.	Morgan Rod Mill	GE	1st Quarter 1948
Tube Mills				
National Tube Co.	Lorain, Ohio	42" Piercing Mill	GE	4th Quarter 1948
National Tube Co.	Lorain, Ohio	9-Stand Continuous Tube Mill	GE	4th Quarter 1948
National Tube Co.	Lorain, Ohio	12-Stand Reducing Mill	GE	3rd Quarter 1948
National Tube Co.	Lorain, Ohio	12-Stand Sizing Mill	GE	3rd Quarter 1948
National Tube Co.	Gary, Ind.	Piercing Mill	GE	1st Quarter 1949
National Tube Co.	Gary, Ind.	8-Stand Continuous Tube Mill	GE	1st Quarter 1949
National Tube Co.	Gary, Ind.	12-Stand Reducing Mill	GE	1st Quarter 1949
National Tube Co.	Gary, Ind.	12-Stand Sizing Mill	GE	1st Quarter 1949

* Indicates old mills speeded up and/or revamped.
** 42" Skin Pass reversing cold mill purchased from Granite City Steel Co. and being converted to 84" mill.

Sheet Steel Capacity Expands

Work progressing on substantial additions to flat-rolled steel facilities but shortage of sheets and strip likely to continue throughout next year

SHORTAGE of flat-rolled steel products is likely to continue throughout 1948 despite the $448 million expansion program now under way in the industry.

Steel producers point out that the 3 million tons plus of new flat-rolled capacity which was scheduled for completion by mid-1947 will not be available until the end of 1948 and as a result current shortages can be expected to remain to plague consumers.

Set Back by Strikes — Strikes and other delays within the equipment supplying industries have been the cause of this temporary set-back. As new capacity is added some relief will be afforded. However, the overall picture will remain clouded until such time as all the supply-demand factors have been satisfied. The steel industry will be able to turn out about 19 million tons of flat-rolled when the expansion program is completed. Output this year will fall just under 18 million tons and will set a new record.

Most of the nation's flat-rolled steel producers have under way at this time expansion programs for further increasing their capacity. Many companies have under consideration such programs but are withholding action due to the high construction costs.

The Bethlehem Steel Co., one of the nation's largest producers of flat-rolled products, will add annual capacity of some 2 million tons when its current construction program is completed.

During 1948 new continuous strip mills will be put into operation at the Sparrows Point, Md., plant of Bethlehem, the Midland, Pa., plant of the Crucible Steel Co. of America and by the Great Lakes Steel Corp. Modernization programs include the existing mill of the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., and revamping of the 132-inch continuous plate mill of the Geneva Steel Corp. plant at Provo, Utah, for hot-strip production. This strip will be cold reduced by Columbia Steel Co. at Pittsburg and Los Angeles, Calif.

More Cold Reduction—The greatest activity during the last few years has been in the field of cold reduction strip. There have been built or are building at present 13 continuous cold reduction strip mills of the tandem type, ranging in size from 26 to 93 inches. Of the reversing cold strip mill type, there are 14 units building or in operation at present, in addition to 14 skin or temper pass mills for subsequent temper passing.

With all this capacity, which should be made available during the coming year, the general picture for flat-rolled products should greatly improve. In 1946, shipments of flat-rolled products were 14,140,198 tons while 1947 shipments are expected to be around 17,974,400 tons, gain of 27 per cent.

The table on page 66 shows the latest lineup on new mills, as well as those which have been speeded up or revamped.

Builders Hope To Hold 1948 Tool Prices Firm

Taking the long view and keeping their fingers crossed as to the course of the inflationary spiral over the coming months, machine tool and industrial equipment manufacturers hope to hold prices during the first quarter of 1948. Their actions will be based largely on the upturn their business volume has taken in the last few months.

Sales trend has taken a turn for the better since the tool show. L. S. Starrett Co., Athol, Mass., manufacturer of precision hand tools, etc., which introduced 15 new items at that time, has found a 45-hour workweek necessary to take care of its increased volume of business and several departments have been working a night shift of four hours three evenings a week. Marshall & Huschart Machinery Co., Chicago, reports its sales are well ahead of the national business trend and in the last 90 days has found them to be 50 per cent ahead of the volume in the previous three months.

In stating their sentiments about price policies for the beginning of next year many companies are taking a fence-straddling position. Their final decisions will depend in large measure on wage rate increases which may be made, on possible imposition of government controls and on expanded output which may be required as Marshall Plan needs fully unfold. Parts suppliers' price policies, also much in doubt at this juncture, make firm pricing of equipment which can not be delivered for some time impossible for most companies.

To hedge against higher prices for components, some companies are quoting firm prices for those machines which can be built with parts now in inventory; machinery not now completely equipped with parts will probably not be quoted on a firm basis until it can be learned whether these materials will be available later at present costs.

No Gold Rush in California

GOLD MINING, once a major factor in California's economy, has dipped to a low level because rising operating costs have made a large portion of the industry's operations unprofitable.

Production in California in the first nine months this year amounts to about $10,800,000, and this year's total is expected to be only a fourth of output in 1940 when production was $51 million.

Decline reflects a widespread shutdown in underground operations and reduction to 70 per cent of capacity in dredging activity.

In 1940 more than 1000 underground mines were producing gold in California, but the total number operating at present is less than 50.

Down During War—For three years during the war the entire U. S. gold mining industry was shut down by government edict. When the ban was removed in July, 1945, some mines were unable to reopen. Other mines which did reopen, only after spending large amounts on improvements, were forced to close again when high costs wiped out profit margins.

Labor costs, which account for two-thirds of lode mining costs, now are double the rates being paid in 1940, and the cost of equipment and materials has expanded nearly as much.

Price Set by Law — The price of newly-mined gold is set by law at $35 an ounce, and it is unlikely the government will make a change in that price. Gold is neither an essential commodity nor is there a shortage.

As a result the gold mining industry foresees further declines in operations, because costs still are rising.

Gold dredging operations, which now account for about 80 per cent of California's total output, compared with about 50 per cent of the total before the war, have been affected less than underground operations.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Army experts conclude placing of key industrial plants underground and removal of others from congested areas is not the answer to bombing and guided missile attacks

AFTER extensive study, including thorough investigation of war plant locations in Germany, United States Army experts have concluded the placing of key plants underground and removal of others from congested centers to outlying areas is not the answer to bombing and guided missile attacks in another war.

Experience in Germany proved that even though the plants themselves are out of the reach of aerial attacks, they can be put out of production by effective bombing of transportation facilities and of all sorts of service establishments not so located as to have immunity from attack.

Best Answer—The best answer now available is to prepare industry for immediate all-out production in event of another war, so that our fighting forces will be able to nullify attacks. Germany fumbled a golden opportunity to win World War II when it failed to organize its industry for all-out production before 1942, so that the placing of many German plants underground even before the outbreak of the war did not prevent the German defeat.

"The implications of air power and atomic energy on war production and the supporting economy are vital and unsolved," says a report prepared under the direction of Major General G. F. Robinson, now a member of the National Resources Security Board. "It may be useful to caution, however, that underground construction is not the solution it may at first seem. Not only is it costly and time-consuming to prepare, it may interfere with mass production techniques and so be inefficient in operation. Dispersal of industry has a similar result. Neither solves the transportation question."

German Plant Dismantling

Dismantling of German factories under the Revised Level of Industry Plan for the Bizonal area does not conflict with objectives of the European Recovery Plan and increase foreign aid costs to be borne by the United States as is alleged in certain press statements, Acting Secretary of State Lovett states. Neither do the facts support the claim Germany could in the near future produce from these plants products urgently needed by other European countries; nor that dismantling of the plants diverts substantial amounts of German labor and materials from productive use. Furthermore, he says the plan does not place a permanent ceiling over the future German standard of living and severe unemployment.

Serve as Reparations—Secretary Lovett points out that the basic purpose of the dismantling program is to transfer as reparations to countries which suffered war damage excess German productive capacity. Full use of existing productive capacity in Germany, he said, is prevented by shortages of food, fuel, and raw materials. The only way Germany could use her total industrial capacity would be to grant her absolute priority over other European countries in the allocation of scarce materials.

At present, he says, capital removals are the only form in which Germany can pay even partial reparations. Contemplated removals largely represent transfers of plants which were established in connection with the country's war machine and which have been determined unnecessary for the German peacetime economy. Other countries, because of war damage, need this equipment. Removal of it from Germany will tend to ease the financial burden on the United States through partial fulfillment of capital requirements of countries needing assistance. Further, the products manufactured as this equipment is integrated into the productive facilities of recipient countries will serve also to lessen the need for aid.

NEW DEPARTMENT

Subcommittee of the Senate Commerce Committee has proposed a new Department of Transportation to be represented in the President's cabinet by a secretary of transportation. The new department would embrace the Interstate Commerce Commission, Civil Aeronautics Board and Civil Aeronautics Administration. Sponsor of the legislation is Senator Capehart (Rep., Ind.).

Civil Air Development

Major responsibility for developing a sound economic pattern for the nation's air lines as well as advanced-type transports for their future use should be given his department, Secretary of Commerce Harriman recently told President Truman's Air Policy Commission. The secretary maintained that the Civil Aeronautics Board, presently charged with the function, should largely restrict itself to quasi-legislative and quasi-judicial activities affecting the industry.

Secretary Harriman said future transport planes for civil use were too expensive for either manufacturers or air line operators to engineer and build. He advocated that his department undertake the necessary research and development costs. Since the Air Force already is organized for a similar military aircraft procurement program, he urged that it act as the contracting agency for civil air transports of advanced design, though the Commerce Department, with the air lines, would determine the transports' basic characteristics.

The commission was told by Air Force Secretary W. Stuart Symington that unless Congress makes additional appropriations for the Air Force the latter's strength of 55 groups, expected to be reached by Jan. 1, will have to be cut to 40 by next fall. He insisted that a 70-group air force, backed by strong air reserve, is the nation's minimum requirement as safeguard against possible foreign attack.

RFC's Future To Be Debated

A Senate Banking & Currency subcommittee will start public hearings Dec. 11 to find the answer to the question: Shall the life of the Reconstruction Finance Corp. be extended beyond the present expiration date of June 30, 1948? RFC had a vast number of special chores assigned to it during the Roosevelt era and during the war. The question now

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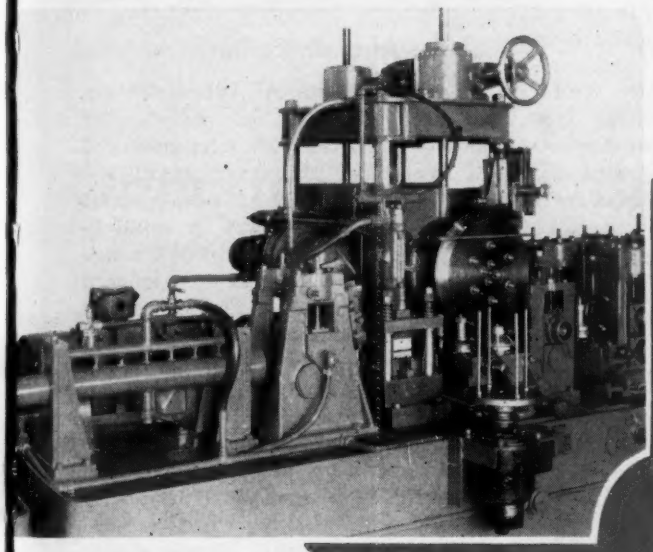

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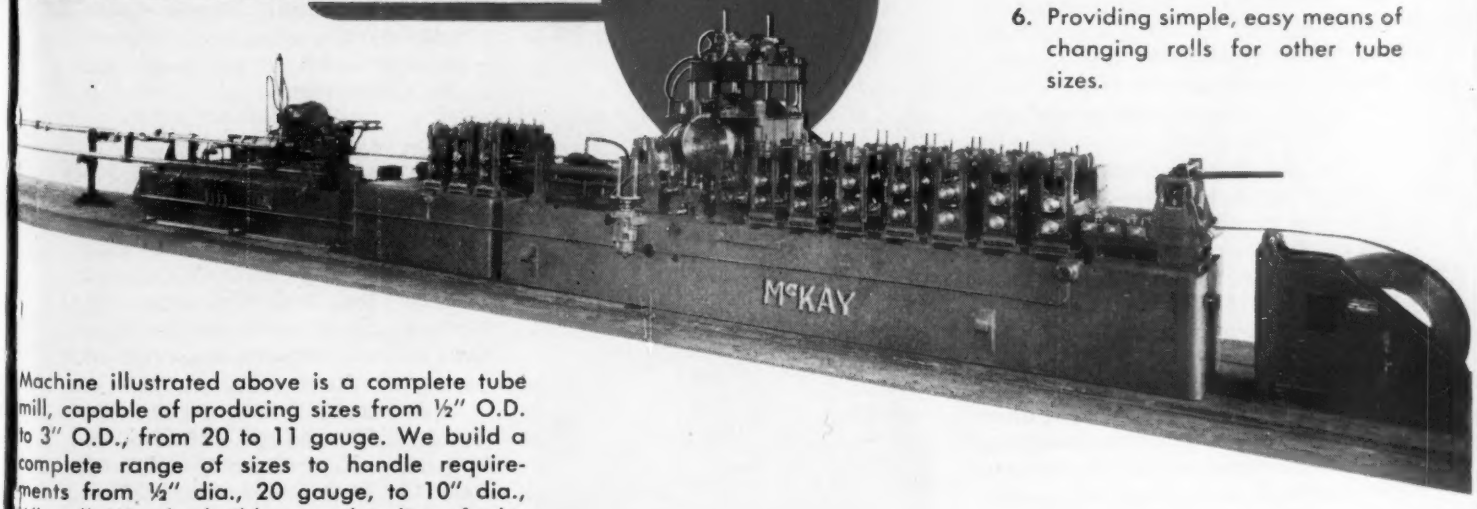
This has been accomplished by:

1. Simplifying and centralizing all necessary controls.
2. Complete protection through approved safety devices and interlocks.
3. Supplying motor drives and push button controls to essential heavy duty motions.
4. Eliminating necessity of welding from coil to coil — strip from coil threads itself through machine, without manual assistance.
5. Automatic Rotary Head Cut-off (patent pending) producing lathe cut and accurately maintaining desired lengths.
6. Providing simple, easy means of changing rolls for other tube sizes.



Machine illustrated above is a complete tube mill, capable of producing sizes from ½" O.D. to 3" O.D., from 20 to 11 gauge. We build a complete range of sizes to handle requirements from ½" dia., 20 gauge, to 10" dia., ½" wall. We also build a complete line of tube and bar drawbenches. We solicit your inquiries.

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before Congress is: What sort of a charter shall be given to the RFC for the long future. There is a general impression that some sort of a government lending agency like the RFC is needed, but as yet there is no agreement as to the limitations within which the RFC authority should be set.

Installment Buying Control

Just how far Congress will be willing to go in restoring credit control authority to the Federal Reserve Board is uncertain. As a general thing, opinion in Washington has leaned to the view installment buying of so-called durable consumer goods, such as automobiles, washing machines and refrigerators, stood a good chance to be tightened up temporarily in any inflation control move taken by Congress. However, the Federal Reserve Board has asked for permanent authority to regulate installment buying, and at very least, legislative power to exercise necessary restraints for up to three years.

"Need for regulation is acute at the present time," R. M. Evans, member of the FRB board of governors, told the Senate Banking Committee, "but the need is not merely a temporary one. Experience has shown that excessive expansion and subsequent contraction of consumer installment credit contributes substantially to economic instability."

The Board asked for control legislation which would be much the same as the restrictions which expired Nov. 1. These permitted the reserve banks to fix the amount of down payment and the period over which debt must be paid up.

That the Board's request will encounter some stiff opposition from business is certain. The American Bankers' Association, for one, has criticized the move to restore controls. It maintains inflationary pressures on prices do not stem from installment buying, but from the vast purchasing power in the hands of the public generated by the wartime fiscal practices of the government and continued excessive spending by government. It does not think consumer credit constitutes a critical area in the inflation pattern, nor does it believe reimposition of consumer credit controls will act as a significant deterrent to the inflationary forces at work.

What About German Scrap?

Representative Kersten (R., Wis.) wants something done about getting the scrap out of Germany to relieve the shortage which is hampering industrial production in this country. Returning recently from a European tour, the legislator declared that Germany's biggest exportable surplus today is scrap; that industrial Germany is a graveyard of tangled steel with enough scrap to supply the entire world. The Krugg Works, he said, is 3 1/2 square miles of twisted steel but apparently nobody has thought about exporting it.

Whether Representative Kersten will press for some action looking toward the bringing back to this country of a large volume of German scrap is not known. However, the seriousness of the scrap supply situation in this country is well recognized and various government agencies are bending efforts to get out as much as possible. The most recent government move, which resulted from a suggestion by Walter S. Tower, president, American Iron & Steel Institute, is by the Department of Commerce. This government agency is mapping out a campaign to enlist the co-operation of all trade and industry associations in encouraging their members to generate scrap and return it to normal channels. The new "drive" will be aimed at the scrapping of obsolete equipment for which there is no further anticipated use.

WILL L. CLAYTON

Head of the American delegation at the United Nations trade and employment conference held in Havana, Cuba, was Mr. Clayton, representing the Department of State. More than 1000 delegates, representing 62 countries attended. NEA photo

Battery Export Licensing

Beginning with the first calendar quarter of 1948, the Office of International Trade announces, automotive storage batteries will be removed from the Limited Distribution License procedure and placed under the Consolidated License procedure. A separate license application should be submitted quarterly for each country in Group K.

Sharp Aircraft Cutback

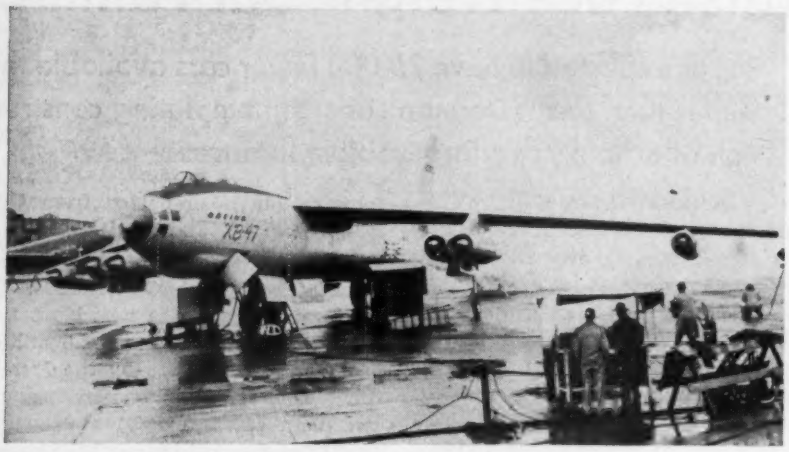
Civil Aeronautics Administration reported last week only one-quarter as many civil aircraft were produced in September this year as in the corresponding month of 1946. Greatest production cutback was in small 2-place planes with a total of 547 turned out as against 3554 in September a year ago. Total production of civilian craft was 1028 in the month compared with 4090 in the like 1946 month. Total number of planes in use on the nation's scheduled air lines was reported at 957 on Nov. 1. On the same date last year 804 were in use. The Armed Forces accepted 323 planes in September, a 53 per cent increase over August. Aicraft engines valued at $26,600,000 were shipped in September, of which 85 per cent went to the Armed Forces.

Protests Pig Iron Shipments

Assailing the "loose thinking and planning" of the State Department in its Interim Aid Program, Rep. Ralph A. Gamble (R., N. Y.), chairman of the Joint Committee on Housing, recently renewed his protests against proposed shipments of pig iron to Italy.

In letters to Secretary of State George C. Marshall and William Martin, president of the Export-Import Bank, Chairman Gamble asserted that recent and projected shipments will deprive the United States of the soil pipe needed to complete 350,000 homes.

As a result, he said, "veterans and others who are being called upon to help finance the regeneration of Europe find themselves in the ironic position of being homeless while critically needed building materials produced under government subsidies are being shunted abroad."



JATO ROCKETS ON JET BOMBER: Boeing's big new XB-47 six-jet swept-back wing bomber is equipped with 18 auxiliary rocket motors, capable of producing 18,000 lb of thrust for auxiliary or emergency power needs. Photo shows three of the rocket motors being fired in a pre-flight test. NEA photo

Opportunities in Research

Widespread industry participation in work being conducted by Navy revealed at 2-day conference of Navy Industrial Association

MANY opportunities for industry in research and development activities were revealed by Navy spokesmen at the recent two-day conference with members of the Navy Industrial Association.

Of these a large proportion are of interest to the metalworking industries. Brief reviews of the thought-provoking suggestions outlined by four of the speakers follow:

Projects Under Way — Rear Admiral John J. Manning, Civil Engineering Corps, said that because we know guided missiles and long-range planes can go over the top of the world, we have the following projects under way: Arctic huts—light, sturdy, easily assembled, well insulated (we already have some pilot models from Douglas Aircraft Co. and Southern California Homes Inc.); a device for quickly measuring the thickness of ice (RCA is working on an electronic instrument); improved low-pour-point lubricants; cargo sleds; cold field lubricator units; cold starting aid kits; water carriers, snow compaction equipment; improved amphibious invasion craft (we are well along on the development of a walking barge—it can propel itself in open water, push itself through surf, climb up on a soft beach and walk through a mud flat that would scare a muskrat).

A better ship-to-shore overhead tramway on the principle of the old breeches buoy (we are working on it at Port Hueneme, Calif.); stabilization of beach soils (Princeton University is working on this); lightweight generators (Detroit Diesel Engineer Division of General Motors is helping develop a 60-kilowatt generator about half the weight of the present unit); lightweight air compressors (we're about to let a contract for a pilot model).

Lighter building materials that can be transported by air; construction machinery that can be knocked down for air transport and quickly assembled on the site; bomb-resistant structural designs; lightweight piling (we are making model tests on flexible sheet piling and on lightweight sectional nesting piles).

We are working on a new 260-ton floating drydock, and we have just completed a successful test of a new type seaplane slip which is very pleasant for the pilot of a plane—the slip comes out to meet him and by means of water jets guides his plane into docking position.

Aircraft Launching — Rear Admiral Donald Royce, Naval Air Material Center, Philadelphia, said that to launch and recover aircraft from a carrier is basically difficult; catapult launching equipment and arresting and barrier recovery equipment are the heart of carrier aircraft operation and many problems require solution. The wire rope industry, which aided in development of better arresting gear wire rope, is presently working with the Navy on a further development which, if successful, will result in the first fundamental change in wire rope manufacture since preforming was invented.

The Navy has turned to industry for assistance on many problems and needs more help than it is getting. For example, in connection with a confidential project concerned with launching aircraft at supersonic speeds, Reaction Motors Co. is studying the problem of generating the tremendous launching energies required; they are investigating combustion of gasoline and liquid oxygen, at 10,000 pounds per square inch pressure.

There are many possible energy generation systems that require similar study. As another example, Chance Vought is studying the problem of application of catapulting forces to aircraft structure, and the handling of aircraft on the Navy's carriers.

As another, Chance Vought and All American Aviation Corp. are working on a problem which is vital and which as yet has had no completely satisfactory solution. This is a universal barrier which will stop any errant airplane and prevent it from becoming a lethal derelict on the carrier deck.

Other problems on which the Navy needs help include development of flame damping systems for night fighter planes, development of control mechanisms for turbo-jet engines, and investigation of jet airplane engines under icing conditions, development of pressure breathing equipment, solution of seat ejection problems, and development of improved alloys to meet extreme high-temperature requirements of jet aircraft engines.

Testing Alloys — Captain W. D. Leggett, Naval Engineering Experiment Station, Annapolis, Md., said alloys, representing the latest development in the field, are being tested at elevated temperatures for static and dynamic properties under the influence of cyclic stresses, at temperatures as high as 1600 to 2000 degrees Fahr. They are tested as gas turbine blades and the turbine wheel in use at the present time is fitted with blades of 12 different alloys. The wheel operates at 15,500 revolutions per minute, producing a blade stress of 10,000 pounds per sq in. from centrifugal force. We make frequent determinations of the creep of the

blades and their erosion under the hot gases.

Metallurgical Research — Capt. A. G. Mumma said it is logical to think a boiler and steam turbine plant could utilize higher temperature than 850 degrees Fahr., our wartime standard, if a gas turbine can operate at 1300 to 1500 degrees. Metallurgical research should permit new superheater materials to withstand high tube temperature, new piping for high strength at elevated temperatures, and stronger and more efficient turbine blades.

Research in heat treatment and hardening processes can open new fields of high tooth loading of gears, high capacity bearings, and lighter and stronger machinery parts of all kinds. Combustion research should permit smaller furnace volumes, higher efficiency and less fouling of heat transfer surfaces. Heat transfer research has a most promising field for reducing overall size of boiler heating surface and gas turbine regenerators.

Bearing and lubrication research holds promise in higher rotative speeds.

Other research is aimed at cutting space and weight of electrical machinery and its operation at higher temperatures.

Battery research is far from finished.

Improvement in propulsion machinery comes partially from advances in the properties of materials, but in large part from elimination of unnecessary margins in factors of ignorance sometimes called factors of safety.

Metal Powder Group Re-elects Officers

Metal Powder Association held its annual meeting recently at the Stevens Hotel in Chicago. The following officers were re-elected: H. E. Hall, Metals Disintegrating Co., Elizabeth, N. J., president; S. K. Wellman, S. K. Wellman Co., Cleveland, vice president; and Robert L. Ziegfeld, acting secretary-treasurer.

Two new members elected to the board of directors to replace retiring members are George H. Tulley, Metals Refining Co., Hammond, Ind., and T. T. Moore, General Aniline & Film Corp., New York. Others serving on the board are T. L. Robinson, Wel-Met Corp., Kent, O.; B. T. duPont, National Radiator Corp., Johnstown, Pa.; Virgil T. Price, Pyron Corp., Niagara Falls, N. Y.; and M. A. Hunter, Federal-Mogul Corp., Detroit. Mr. Robinson was elected chairman of the board.

British Face Freight Car Famine

Roads expected to have 25,000 fewer cars available this winter than last. Dorman Long contemplating construction of Britain's two largest blast furnaces

BIRMINGHAM, ENGLAND

THREAT of a transportation crisis this winter is hanging over all British industry. The shortage of rolling stock which has been a serious handicap since the end of the war is likely to become worse in the next few months and may well hold up deliveries of raw materials to steel mills and distribution of finished steel to metalworking industries.

The average number of cars waiting for repairs has reached 200,000, according to the minister of transport, and about 90,000 a week are being placed back in service. Because scrapping of old cars is in excess of new car building, the roads begin this winter with about 25,000 fewer cars than in service at this time a year ago. Estimates place the total of available cars at 1,020,000, of which about 450,000 are needed to move coal, leaving less than 600,000 to carry other commodities.

Remedial Measures Planned—To help avoid the slowing down of deliveries, the minister called for more rapid car loading and unloading and increased use of trucks. It is now planned that about 25,000 tons of coal a week will be moved by trucks, and other products will be shipped in these carriers to the maximum extent.

Although steel output has reached the annual rate of over 14 million tons and is expected to hold near that figure unless the fuel situation deteriorates in the remaining weeks of the year, industrial users still find their allocations insufficient to meet their requirements. Manufacturers of agricultural implements, for example, have received government directives to increase production for export and domestic use but so far steel for this purpose has not been put on the priority list. Steps are being taken to give more steel to this class of user, however, which will mean that less will be available to less essential users.

High output of steel, dependent as it is on increased supplies of basic pig iron and scrap, is making inroads on the inventories of these materials, which are not being produced at the current rate of consumption. Strong appeals have already been made to engineering firms for all available scrap, and it is hoped a considerable tonnage can be imported from Germany.

More Iron Capacity—A project for installation at the Cleveland works of Dorman Long of a new blast furnace plant to cost over £4.5 million is under consideration by the Iron & Steel Board. The project includes two new blast furnaces to be the largest in the country, and the necessary expansion of gas cleaning and distribution facilities and new railroads and bridges. The new furnaces will have hearth diameters of 27 ft and will be among the world's seven largest. Construction is projected on a 48-acre site which is extensive enough to accommodate three or four additional furnaces of similar size which will be required if the new plant is developed to its maximum. The project is expected to take three years to complete and when linked with the company's new open-hearth steelworks and the one at Redcar will have a rated capacity of about 22,000 tons of iron a week.

Consumer Pressure Sustained—With automotive plants in the Midlands engaged in a large export program, they continue to take all the steel the mills can deliver. Plate and sheet mills are heavily booked up to the end of the year. Rerollers are receiving a larger tonnage of billets and bars than they did a few months ago but are unable to satisfy the demand from areas such as the Midlands which are heavily committed to the export program. The shortage of sheet bars continues to be a major worry. Strip is also in heavy demand and substantial tonnages of light rails and structurals are badly needed for maintenance of collieries and manufacture of mining equipment.

Labor shortages in the basic industries have become acute. Iron and steel plants and heavy electrical equipment manufacturers, particularly, are finding retiring skilled laborers difficult to replace. Training programs to teach these skills have been started wherever possible.

Britain's Production And Exports Increase

Shattering of output records in many of Britain's important indus-

tries recently attests to the success of the nation's efforts to fight its way back.

Not only is production now substantially higher than prewar but an increasing proportion is being exported.

Coal Output Rises—Even coal production, which for several years has been the biggest problem facing the country, is sharing in the overall increase in production. For the week ended Nov. 8, 4,243,000 tons were mined, which total was within 3 per cent of the average weekly output for 1938.

Steel production is now 37 per cent over 1938, truck output has increased 92 per cent, manufacture of agricultural tractors is up 425 per cent, 40 per cent more railroad cars are being built than in the prewar year, and tonnage of merchant shipping under construction is up 144 per cent.

Austerity Governs Life—The auto industry reflects the national effort to produce more and use less to be able to meet export targets. Britain is now making about the same number of cars as it did before the war, but exports of cars have risen 242 per cent. All pleasure motoring has been stopped to conserve the domestic supply. In 1948 400,000 cars are to be built, of which 80 per cent will be exported.

Even more than production, exports of the nation's products have soared beyond 1938 figures, and 73 per cent more manpower is now working on products for exports than at that time. The following selected products of the British metalworking industries typify the gains made in exports in September over the 1938 average:

Product	Exports	% of 1938 By Volume
Steel Bars, Rods ..	13,200 tons	124
Aluminum & Alum. Mftrs.	53,100 cwt	506
Agric. Mchy.	4,900 tons	327
Elect. Mchy.	6,700 tons	181
Machine Tools	4,600 tons	230
Textile Mchy.	7,100 tons	120
Automobiles	12,582	342
Trucks	2,182	707
Motorcycles	4,097	248
Bicycles	129,600	270
Locomotives	3,400 tons	170

Advocates Lifting U. S. And Canadian Tariffs

Reduction or removal where possible of tariffs and trade restrictions existing between the U. S. and Canada has been advocated by James D. Mooney, president of Willys-Overland. He pointed out that the lifting of import tariffs on the many materials purchased by the U. S. in Canada, including nickel, copper, lead, zinc, paper, etc., could add many millions of U. S. dollars to Canada's supply.

Chile Plans New Steel Plant

Koppers Co. awarded contract to supervise construction, engineering and management of $50 million steel works, to be first integrated facility in Chile

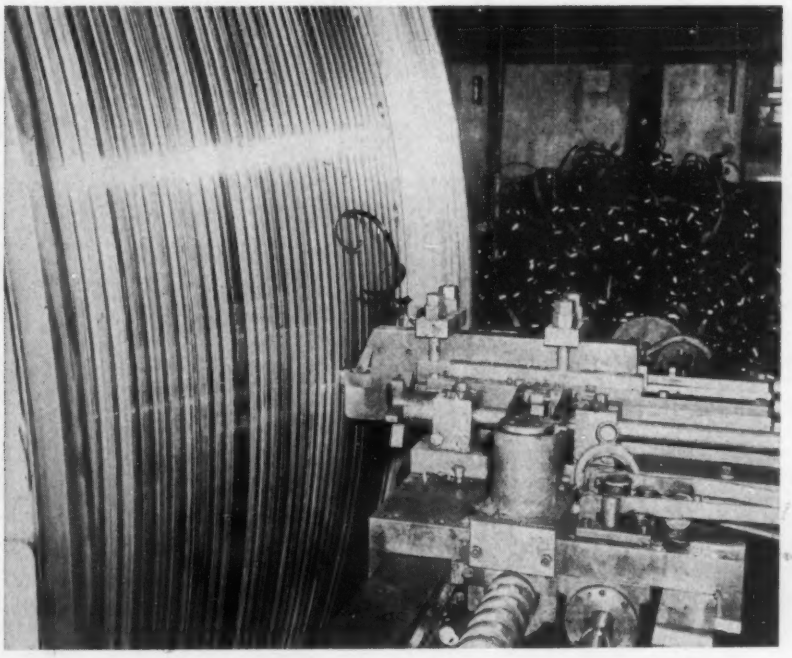
KOPPERS Co. Inc., Pittsburgh, has contracted with Compania de Acero del Pacifico of Chile (Pacific Steel Co.) to supervise construction, engineering and management of the first integrated steel plant to be built in Chile.

In a joint announcement, General Brehon Somervell, Koppers' president, and Roberto Vergara, U. S. representative for Corporacion de Fomento de la Produccion, Chilean equivalent for the Reconstruction Finance Corp., said that the new facilities will be erected at Concepcion, Chile, on San Vicente bay at a cost of more than $50 million. Construction will be financed partly by Chilean capital and partly by the Export-Import Bank. Foundation work has already been started; the entire plant is expected to be in operation by the end of 1949.

Supervises Project—W. C. Snyder Jr., a vice president in Koppers' Engineering & Construction Division, will have overall supervision of the entire project. To produce 250,000 tons of finished steel products per year, the plant is designed to use Chilean ore and Chilean coal. Under terms of the contract Koppers will have supervision over all matters involving design, selection of top personnel, purchasing, construction and operation for an indefinite period which may continue as long as 20 years.

Five integrated parts of the installation are: 1. Coke ovens and auxiliaries for handling tar and light oils; 2. equipment to purify the coke oven gas and a gas transmission line to serve industrial and domestic users; 3. blast furnace; 4. open hearth furnace, bessemer converter and electric furnace; 5. finishing mills to produce flat-rolled and merchant products.

The plant will be located on a bay, affording a deep water harbor for shipping.



ONE-PIECE MASS PRODUCTION: Twelve tons of metal chips are removed from one part in a single setup on one lathe in the Bartlett Hayward plant of Koppers Co. Inc., Baltimore. Part is a mine hoist drum, 20 ft in diameter, with 7 ft 10½-in. width between flanges. Roughing of flange sides and drum is performed with 1¼-in. square shank tool tipped with Carboloy grade 78B. Surface speed is 240 fpm and a 0.020 to 0.030-in. ¾-in. depth cut is taken. Grooves are plunge and finish cut with Carboloy ¾ and 1⅜-in. radius tools, as illustrated

PRODUCTION NEWS!!!

a new era in shaft-turning

The new BULLARD MAN-AU-TROL HORIZONTAL LATHE Model 30H produces three identical parts at once . . . with interchangeable manual or automatic control!

The new BULLARD Man-Au-Trol 3-Spindle Horizontal Lathe will enable you to *multiply* production on shaft-turning, grooving, facing, angle-turning or between-center chucking jobs — and to reduce costs proportionately. In addition, this latest BULLARD machine has many other improvements contributing to better workmanship and big savings in time and money.

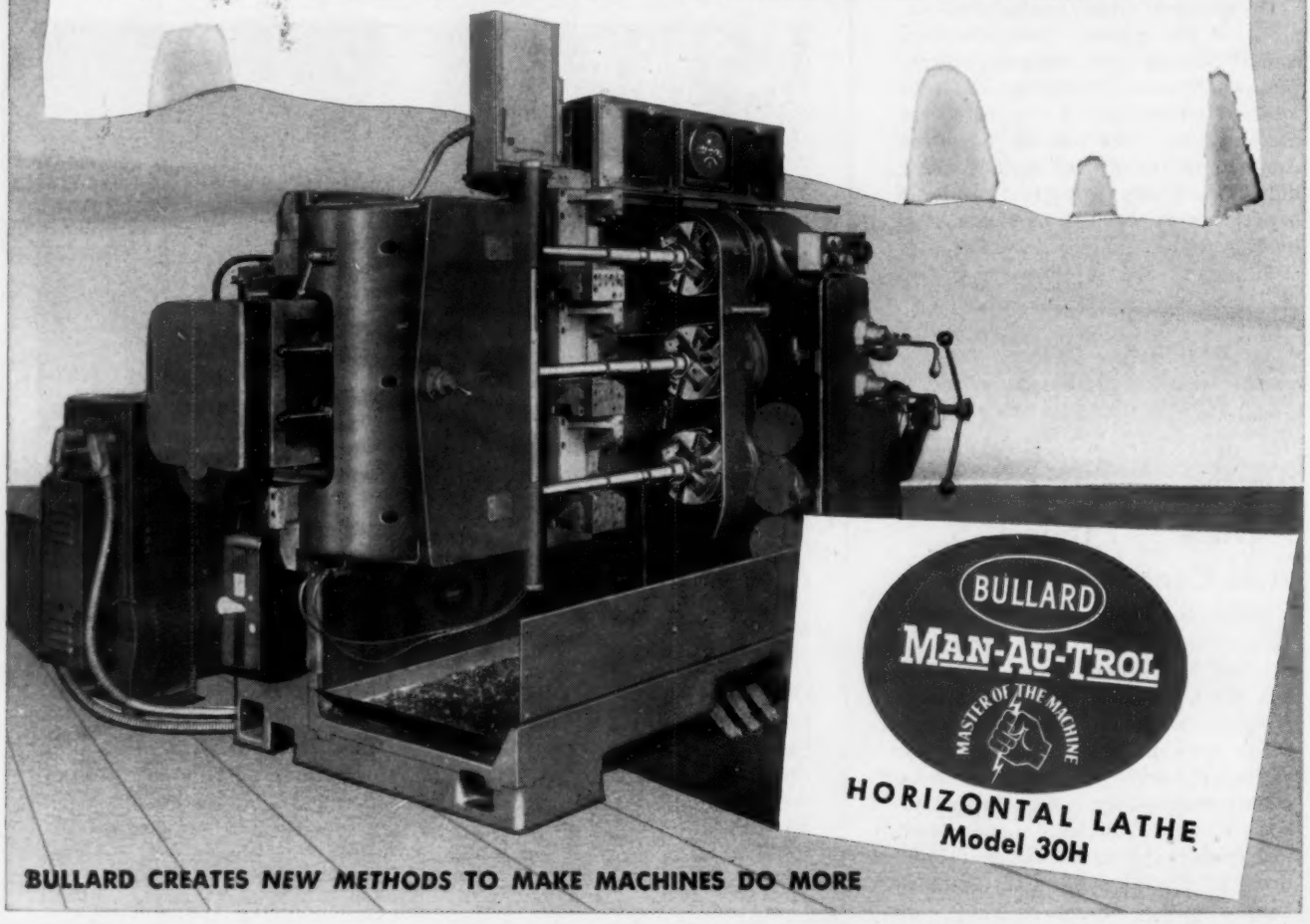
NO OTHER SHAFT-TURNING LATHE OFFERS ALL THESE ADVANTAGES

Hydraulic, centering-type chucks on all 3 spindles . . . each chuck operated by individual foot-treadle, freeing operator's hands . . . saddle and tool slide travel on vertical ways, free of chip area . . . full chip control, including automatic breakage for disposal, and prevention of accumulations around operating parts . . . complete visibility and accessibility of work and tools . . . massive weight and over-all rigidity assure minimum vibration for maintained accuracy . . . Man-Au-Trol control, head stock and all other machine-operating controls are at operator's right.

PLUS THE ADVANTAGES OF BULLARD MAN-AU-TROL

Providing manual operation on short runs, Man-Au-Trol enables quick conversion to 100% automaticity on longer runs. Controlling the head through *39 separate functions in any sequence*, it allows the machine to cut practically continuously, without stops for customary manual operations or loss of time due to the human element. While retaining the versatility of manual control for short runs, this new BULLARD machine can be quickly changed to fully automatic operation on production of 3 identical parts at once — substantially lowering manufacturing costs.

Why not find out how this cost-saving combination can benefit your own production? Engineering data and other facts on the new BULLARD Man-Au-Trol 3-Spindle Horizontal Lathe gladly sent on request. THE BULLARD COMPANY, Bridgeport 2, Conn.



BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Detailed specifications for new Hudson explain how new model is lowered without loss of room in passenger compartment. Production expected to reach 475 units a day this week, 650 by year's end

DETROIT

WITH several thousand of its new models already in dealers' hands, Hudson is starting to click productionwise, despite occasional stumbles over new manufacturing techniques and a one-day suspension last week when 21 welders walked off their jobs because they felt they should have higher wages in view of the different type of operations they were handling. A second assembly line was scheduled to start last week, and this week it is hoped to push daily assemblies to about 475 and by year-end to 650. Initial output was 8-cylinder models, but the 6-cylinder engine is now in production so both types should be rolling smoothly before long. Body types are sedans, broughams and coupes, although convertible broughams are slated for early assembly.

Last weekend came detailed specifications of the Hudson line and they are of particular interest inasmuch as the company is pioneering an entirely new model from the wheels up. The "monobilt" frame, for example, is a skeleton-type structure of box-section steel members, formed on presses and brakes and spot welded. Base of the structure is four longitudinal pieces to which are welded eight transverse sections measuring up to 6 13/16 in. in depth. Outside longitudinal rails actually are outside and enclose the rear wheels. Vertical box-section members extend upward from the outside rails to the roof, and body and roof panels are welded directly to these structural body and frame pieces. This assembly system has given rise to some speculation as to the difficulty and cost of repairing sheet metal elements which have been damaged in collisions.

Permits Lower Floor — The new construction has permitted the floor to be lowered several inches until it is below the level of the outside sills. In turn, it has been possible to lower the roof of the car without reducing height of the passenger compartment or reducing headroom, so that overall curb height of the car is only 5 ft. Meanwhile the rear seat has been moved completely ahead of the rear wheels, opening up additional seat width and making rear seats the widest of any mass-produced passenger car on the market. Passengers are positioned 2 ft ahead of the rear axle, out of the area of vertical bounce. This, together with the low center of gravity, is claimed to produce an entirely new ride sensation and "hug-the-road" characteristics. Suspension is coil springs at the front, splayed-leaf springs in the rear and direct acting airplane-type shock absorbers on all wheels. Tires are of the new large-section low-pressure type.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,798	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	396,932	331,100
August	360,221	359,111
September	452,068	342,969
October	460,527	410,510
November	415,930*	380,664
December	.....	380,908
12 mos.	.....	3,268,456

* Preliminary.

Estimates for week ended:

Nov. 15	110,663	94,425
Nov. 22	115,197	96,434
Nov. 29	82,932	77,222
Dec. 6	112,000	93,907

Bumpers Recessed — Wrap-around bumpers are recessed into the body and fenders, thereby reducing overall length and adding to a compact appearance. Rear bumpers are bolted directly to the frame instead of being mounted on brackets. Inside the bumpers and located on the body-and-frame members are four box-type jack pads into which a jack head fits securely to prevent the car from slipping off the jack.

Curved glass windshield, with a visual area of 758 sq in., is 167 sq in. greater in area than 1947 models, an increase of 28.3 per cent. Rear window, with 558 sq in. of area, is 27.4 per cent larger than previous models. Side windows are set at an angle of 17 degrees in from the vertical and provide better outward and upward vision, as well as reducing reflections at night.

Six Develops 121 Hp — A redesigned 6-cylinder L-head engine, developing 121 horsepower, is claimed to be the most powerful six the industry has yet built. It is lubricated at 41 points, the lubrication system using a new floating oil intake device to eliminate recirculation of sludge. Engine displacement is 261.65 cu in. and compression ratio is 6.5 to 1, with high-compression aluminum head.

Connecting rods are equally balanced from a predetermined point toward each end for center of gravity, assuring operating balance. Crankshaft is forged in position, a manufacturing operation which eliminates twisting or bending before machining. Pressure-lubricated tappets are of the mushroom type, and are given positive rotation by an angular cam surface. Carburetor is dual down-draft, with a single bowl, each carburetor feeding three cylinders. Water pump and fan shaft are self-sealing and self-lubricating, and are carried in a double ball bearing, relieving the pump of undesirable fan thrust.

Two-Section Shaft—Propeller shaft is in two sections, with three universal joints incorporated in the shaft train, each having needle bearings and lubrication fittings. Steady bearing at the rear end of the front shaft is insulated from the frame by a larger rubber mounting supported by the frame.

Hudson is continuing to offer its "drivemaster" automatic transmission as extra equipment. First introduced in 1942, it permits three methods of driving—completely automatic without use of clutch or gearshift, manual gear shifting without use of clutch, or the conventional system.

New Fan Clutch

Unusual engine feature reportedly to be incorporated in the 1948 Ford line scheduled for production early

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next year is a 5-in. eddy current clutch driving the engine fan. This type of clutch is a development of the Dynamatic Corp., Kenosha, Wis., involving two separate and closely spaced members, the one being driven by intercepting magnetic flux lines from magnet poles built into the other member. A rather complicated electrical system is involved which would not appear readily adaptable to mass-built passenger cars, although simplifications may have been made for its automotive version. The idea apparently is that in cold weather, the engine fan will not operate until the engine temperature is at a predetermined point, at which time the clutch will be energized, thus driving the fan. Likewise, at high speeds, the eddy current clutch will be de-energized, disconnecting the fan and saving 4 to 5 engine horsepower. The eddy current clutch has been adapted to a variety of industrial equipment, including presses, machine tools, overhead cranes and the like.

Poll Prospects on Design

Ford's marketing research department is distributing an ingenious four-color lithographed questionnaire in which recipients are asked to "design their own car" by selecting one of a number of arrangements for each major component—body, frame, engine, interior, decoration, accessories, etc. A price is attached to each selection and when all have been totaled the individual can see how close he comes to having a price he would pay. Usually, of course, the total comes to a higher figure, so the recipient then can go back and readjust some of his selections to meet his price. Finally he is asked to mail his price tally card, attached to the questionnaire, both the original and readjusted columns, back to the company. From the data, market analysts can quickly tell which features of cars prospective buyers are most willing to sacrifice in the interests of lower costs, and thus can provide valuable guides for future model planning.

Reuther Foes Ousted

Wholesale uprooting of the internal organization of the UAW-CIO is in process under the direction of its re-elected president, Walter P. Reuther. His faction now dominates the entire organization and all opposition is being dismissed, from top officials clear down to field organizers. Richard T. Leonard, a former vice president and head of the Ford local, has been given his walking papers and has returned to work at DeSoto as a welder at about half his former union pay. The truculent heads of the Allis-Chalmers local who piloted a lengthy and disastrous strike there, have been muzzled and a reorganization of the local started. No one is assuming all will be peace and quiet under Reuther's firm direction, but at least a higher degree of unity will prevail within the union, and there should be more emphasis on rhetoric in conferences than on wrestling on the picket line in the period ahead.

Ford Official Optimistic

Ford financial experts, in particular H. D. Everett Jr., director of marketing research, are looking on the bright side in their analyses of the current boom, concluding that so long as nothing is done to reduce suddenly U. S. money supply or to undermine its newly aquired (since the war) strength, there are valid reasons for believing the present boom will not give way inevitably to a bust.

New Contract Entered Into

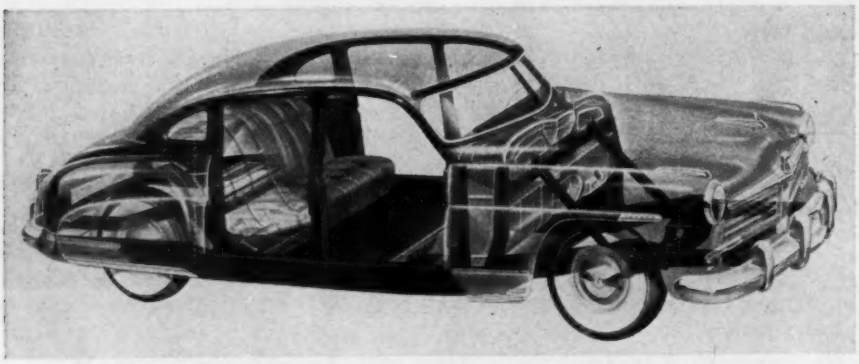
Following completion of deliveries of a new cotton chopper under a contract with the Kaiser-Frazer interests, the N. K. Leeper Co., Dallas, has signed a new contract with Farm Products Division of Kaiser-Frazer for manufacture and delivery of the implement for distribution in eight eastern and midwestern states. The Dallas-made implement had been produced entirely for Kaiser-Frazer under the old contract, but now the machine, known as the Dixie row thinner, will be marketed in the remainder of the country, with few exceptions, by the N. K. Leeper Co.

Production of the implement, which can be attached to any tractor and which under new designs can be used to thin beets, vegetables, tomatoes and cane, is at the rate of 50 to 75 daily.

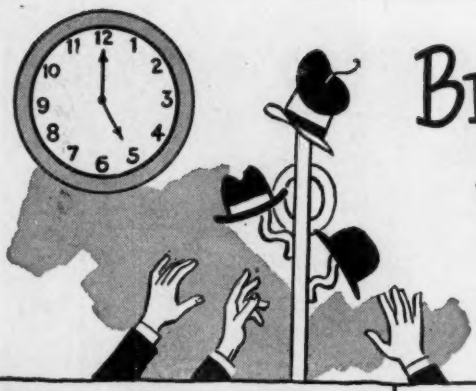
New Coach Distributor

One of the newest enterprises indirectly affiliated with the top administrative level of Ford Motor Co. is Metropolitan Motor Coaches Inc., successor to Transit Busses Inc., exclusive national distributor of Ford motor coaches and parts. President is William B. Livingston, for 27 years associated with GM Truck Coach Division of General Motors and since last May active with Ford in designing and styling a new line of busses. Board of directors includes Peter J. Monaghan, Detroit attorney, E. R. Breech, executive vice president of Ford, J. R. Davis, vice president and director of sales and advertising for Ford, and A. J. Browning, Ford vice president and director of purchases.

As a corollary announcement, the company reveals J. W. Irwin, director of public relations since March, has resigned to head a new company which has been designated by Metropolitan Motor Coaches Inc. to sell Ford busses in the Cleveland-Buffalo-Pittsburgh territory. The new bus merchandising setup is practically a duplicate of the arrangement made early this year to handle sales of Ford tractors, involving the organization of Dearborn Motors Inc., with a directorate including the same Ford officials listed above, except for the president.

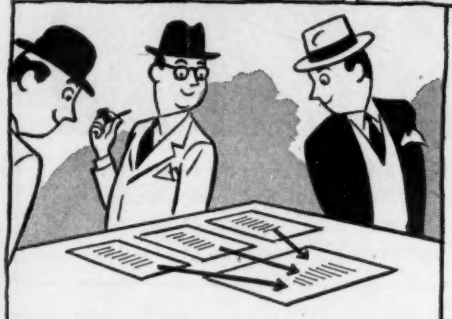


Phantom view showing detail of box-section steel skeleton or frame structure of the new Hudson. Note how outside lower longitudinal members pass outside the rear wheels and form a sill which is several inches higher than interior floor level. Eight transverse members, measuring up to 6 13/16 inches in depth, are welded to longitudinal members, as are the vertical side members. Body and roof panels are welded directly to the skeleton structure, described by Hudson as a "monobilt" body and frame. Observe also that rear seat is entirely ahead of rear wheels



Break this news when day's work is done!

If they stay for full details (and we guarantee they will) you'll know it's *sensational!*



1. Tell your accountants it's now possible to transfer net profit (or other) columns of different reports to a composite report without lifting a pen, without *one* error in transcription.

What's more — this "composite" can be used to produce as many additional copies as are needed—each in 25 seconds.

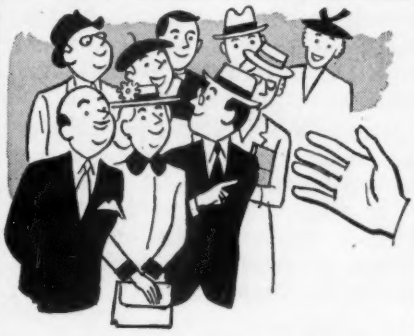
2. Tell your artist "full-color" displays up to 42 inches wide, any length, can be made in a few minutes without make-ready or printing plates.

3. Tell your file clerks they can make exact-size, positive (not negative) copies in 25 seconds... by keeping records on translucent, not opaque, card stock.

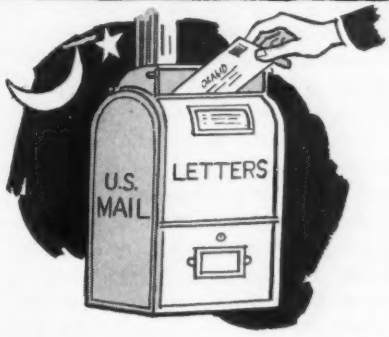
Additions are made in usual manner. Filing is easier. Manual copying — with possibility of errors — is completely eliminated. New method is at least 9 times faster than standard routines.

4. Tell your office manager ordinary sheets of translucent paper serve as "masters". . . can be typed, drawn, or written upon as usual . . . positive copies made in 25 seconds, whenever needed.

Sales, service reports, etc. — on translucent paper—can be duplicated immediately—copies passed on without delay. Cost is lower than you'd ever expect — 1¼ cents per 8½ x 11-inch copy.



5. The biggest surprise! *Tell everyone* that *all* of this work — and hundreds of other jobs, too — is done in one machine, the new OZALID STREAMLINER! No other equipment needed. And each job done in same simple manner, in any office.



6. Be ready for an enthusiastic, into-the-night discussion... which will result in important savings every day, thereafter. Mail this coupon today... for a free copy of "The Simplest Business System." It adds up your dollar savings — job by job!

DEPT. NO. 377

OZALID Division of General Aniline & Film Corp.

Johnson City, New York

Gentlemen: Please send free copy of "The Simplest Business System"... and Ozaprints of typed, drawn, printed, and photographic material.

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Position_____

Company_____

Address_____

Ozalid in Canada — Hughes Owens Co., Ltd., Montreal

Allis-Chalmers Has Century Of Production

ALLIS-CHALMERS Mfg. Co., Milwaukee, which this year is observing its 100th anniversary, attributes its longevity to a long-standing company policy of product diversification.

As support for this statement, the company points to its line of over 1600 products, mainly in the fields of power generation, distribution and utilization for the metal and machine industries, that has been developed over the years.

The diversification policy was first conceived by Edward P. Allis when in 1861 he acquired the 14-year-old French burr mill stone firm of Decker & Seville in Milwaukee. Basing success in large measure on ability to meet changing conditions with new products, the company by 1870 was manufacturing flour and lumber mills with all accessory equipment, upright and portable steam engines, slides, pipe, gages, gearing and shafting, stoves and general iron work of many types.

Blowing Engines Developed — A milestone in the company's history occurred in 1880 with the development of a high-economy blowing engine, first designed for Joliet Steel Co., Joliet, Ill. This unit was the first one that utilized enough waste gases from blast furnaces so that it did not require additional coal to supply the necessary steam for operation.

In addition to these developments, Edward P. Allis & Co. by 1889 had designed and built hoisting engines for various Lake Superior copper mines, rolling mill engines for steel companies, blowing engines for blast furnaces and bessemer converters, and had introduced the wrought iron frame for large engines.

A step toward the firm's present organizational setup was taken in May, 1901, when Allis, Fraser & Chalmers Co. of Chicago, Gates Iron Works of Chicago and Dickson Mfg. Co. of Scranton, Pa., were merged to form Allis-Chalmers Co. This merger gave the new company a product line which included basic machinery for practically every major industry.

Expansion Continues — Important industrial developments in which Allis-Chalmers has pioneered since the turn of the century include the manufacture of gasoline engines for industrial use, design and installation of hydroelectric units for aluminum production, new applications for v-belt drives, application of rotating regulators to arc furnace control, application of synchronous motors on main drives for metal piercing mills and the development of mercury arc rectifiers as converters so that power can be used for induction heating and melting of metals. Today more than 30,000 employees in nine Allis-Chalmers plants turn out products for industry and agriculture.

Walter Geist has been president of the organization since 1942. Serving as vice presidents are H. W. Story, J. M. White, E. H. Brown, W. C. Johnson, W. A. Roberts and J. A. Keogh. Secretary and treasurer is W. E. Hawkinson.

EMPLOYEES EXHIBIT: Brown & Sharpe Mfg. Co. recently re-erected the display the company showed at the Machine Tool Show in Chicago for the benefit of employees who built the machines. Photo shows part of the crowd visiting the display at company's Providence, R. I., plant

Battery Firms Bow to U.S. Anti-Trust Action

Electric Storage Battery Co. and its subsidiary, Willard Storage Battery Co., both of Cleveland, have consented to a judgment which terminates a cartel arrangement relating to electric storage batteries.

The judgment and consent followed a complaint filed by the government on May 16, 1945, which charged an arrangement to divide world markets and to eliminate competition beginning in 1891. The defendants are enjoined from further performance or revival of cartel agreements and from using patents, trademarks and manufacturing information to restrict imports and exports of batteries. They are also required to make available to competing U. S. manufacturers on a reasonable royalty basis the patents which were exchanged between the defendants and the foreign parties in the cartel. The judgment also requires that a large stock interest of Electric in Chloride Electrical Storage, the English company, be transferred to a trustee.

Lake Superior Ore Seen Unchallenged by Imports

Imports of foreign ores do not constitute a serious threat to mining operations in the Lake Superior district iron ranges, and this region of northern Minnesota, northwestern Wisconsin and upper Michigan will "continue for many years to supply about 85 per cent of the iron ore produced in the United States," Hugh M. Roberts, engineering geologist of Duluth, recently told the northern student engineering convention.

As his reasons for these conclusions he stated that large reserves of iron ore still exist in the region, the supply of high-grade ore estimated at lasting between 40 and 50 years with lower-grade ores available for at least 200 years and that less favorable conditions elsewhere would preclude usurpation of this district's share of the domestic market.

Officers Renamed by Standards Association

All officers of the American Standards Association were re-elected at the organization's 29th annual meeting at the Waldorf-Astoria, New York, recently.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

McGill Carbide Tool has been newly formed at 4612 Woodward Ave., Detroit, and will deal in tungsten carbide tipped tools.

—o—

Olin Industries Inc., East Alton, Ill., reports two of its divisions, Winchester Repeating Arms Co. and Bond Electric Corp., both in New Haven, Conn., will soon begin production of a miniature dry cell battery of plastic construction for use in small radios and hearing aids.

—o—

International Business Relations Council has been newly formed at 9 Rockefeller Plaza, New York, and will begin a program of expanding international systems of arbitration, establishing international panels of arbitrators and interpreting American methods of arbitration to all traders with Americans. H. L. Derby, former president of American Cyanamid Co., is council chairman.

—o—

Huot Mfg. Co., maker of plastic molds, tools, dies and specialities, has moved to its new offices and factory at 550 N. Wheeler Ave., St. Paul.

—o—

Hewitt Rubber Division, Buffalo, Hewitt-Robins Inc., has named Industrial Equipment Co., Louisville, Ky., as a distributor of its industrial hose, belting and packing in the Louisville area.

—o—

Arseneau-Price Co. has been newly formed at 10840 E. Warren Ave., Detroit, and will manufacture reamers, end mills, milling cutters and counterbores.

—o—

Cleveland Pneumatic Tool Co., Cleveland, manufacturer of aircraft landing gear shock struts, last month distributed a bonus to its employees of approximately $150,000.

—o—

W. & L. E. Gurley, Troy, N. Y., maker of surveying, meteorological and testing instruments, will hold an open house at its plant on Dec. 16.

—o—

Air Products Inc., New York, has appointed H. A. Brassert & Co., New York, as its engineering consultant in the application, construction and operation of oxygen plants for the iron, steel and allied industries.

—o—

Ohio Ball Bearing Co., Cleveland, has purchased three buildings and land in Cleveland for about $200,000, in a move to expand its activities.

—o—

Permanente Metals Corp., Oakland, Calif., producer of aluminum, has named Eagle Metals Co., Seattle, as its distributor in the Pacific Northwest.

—o—

Leeds & Northrup Co., Philadelphia, manufacturer of measuring instruments, automatic controls and heat-treating furnaces, has purchased a two-story building near its main plant which will be used for expanding its production.

—o—

Reconstruction Finance Corp. reports that its subsidiary, U. S. Commercial Co., will sell aproximately 714 short tons of lead scrap which it has received from Japan. Material will be sold on a sealed bid basis, for delivery fob cars at seller's warehouse, Staten Island, N. Y.

—o—

Department of Commerce reports that world production of natural rubber during 1947 has been at the rate of 1.2 million tons a year, as against a record output of nearly 1.5 million tons in 1941. Reduced output in the Netherlands Indies and Indochina accounts for most of the decline.

—o—

Index Machine & Tool Co., Jackson, Mich., manufacturer of milling machines and related equipment, has named the newly formed Index Machine Co., Jackson, as its sales representative.

—o—

F. C. Thornton Co., Cleveland, manufacturer of steel barrels and containers, was acquired Dec. 1 by Samuel Davey and R. S. Easterday who, with George Leppert, auditor, will form the board of directors.

—o—

Fairchild Engine & Airplane Corp., New York, will conduct a symposium at Oak Ridge, Tenn., Dec. 8-13, on heat transfer and its significance in the study of the application of nuclear energy to the propulsion of aircraft. Atomic Energy Commission is co-operating in the program.

—o—

Office of Technical Services, Department of Commerce, announces a National Inventors Council has been formed to serve as a clearing house for inventions and ideas which will assist the Army, Navy and other public agencies in solving technical problems affecting the national defense and welfare. Council chairman is Charles F. Kettering, General Motors Research Corp.

—o—

Dow Chemical Co., Midland, Mich., has named Saran Lined Pipe Co., Detroit, newly formed, as exclusive distributor for its recently developed specialty pipe and fittings which are lined with a Dow plastic called Saran.

—o—

Murray Co., Dallas, Tex., manufacturer of cotton seed oil mills and cotton gin equipment, has purchased Boston Gear Works Inc., North Quincy, Mass., and will continue to operate it as Boston Gear Works Division.

—o—

Federal Communications Commission has issued an order authorizing the use of recording devices in connection with interstate and foreign message toll telephone service, subject to an automatic tone warning which will notify all parties so engaged that their conversation is being recorded.

—o—

United Nations has published a *General Agreement on Tariffs and Trade,* with schedules of concessions granted by participating countries at the recent conference at Geneva, Switzerland. It may be purchased through the UN Sales Section, Lake Success, Long Island, N. Y., or from the International Document Service, Columbia University Press, New York.

—o—

Jefferson Electric Co., Bellwood, Ill., manufacturer of transformers, ballast and fuses, has purchased Capacitron Co. Inc., Chicago, producer of condensers and capacitors. Production of this equipment will be continued in the Chicago plant.

—o—

Federated Metals Division, American Smelting & Refining Co., New York, has been licensed to manufacture and sell a silicon bronze alloy called Olympic Bronze, the rights to which are owned by Chase Brass & Copper Co. Federated will market the alloy to foundries through its regular sales channels. Chase will continue to produce wrought and extruded forms of the alloy.

—o—

National Supply Co., Pittsburgh, maker of oil field equipment and supplies, reveals that 22 additional employees at the Spang-Chalfant Division plant at Ambridge, Pa., last month completed their 25th year of service, bringing the total to 138 at this facility.

The Business Trend

IN ITS SHARPEST drop since the first week in July when operations in the coal mines and in many of the nation's factories and mills were slowed, STEEL's index of industrial production for the Thanksgiving week ended Nov. 29 registered 158 per cent (preliminary) of the 1936-1939 weekly average. This rate was 13 points below the postwar record of 171 per cent achieved in the previous week.

AUTOS—Contributing most importantly to the lower rate of industrial activity was the sharp decline in autobuilding resulting from the holiday-shortened work-week. The total of 82,932 cars and trucks turned out in that week was 32,265 units less than had been built in the week earlier.

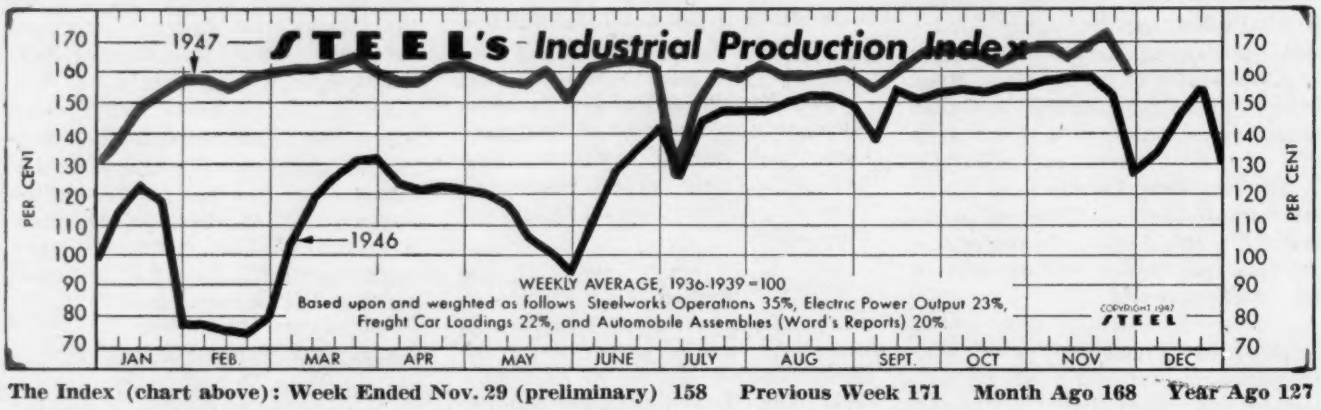
STEEL—The national steel ingot rate, although not quite rivaling the postwar peak of 97 per cent of theoretical capacity, gives promise of surpassing that level in the near future as steelmakers strive to meet the unprecedented demand from consumers, particularly those manufacturing durable goods.

OUTPUT—Industrial production and output of minerals in October rose 3 points to 189 per cent of the 1935-1939 average in the Federal Reserve Board's seasonally adjusted index to the level prevailing the first quarter of the year. Durable goods production, dependent in great measure on availability of steel, increased considerably above the mid-year levels. Minerals output also was up somewhat, owing to further gains in fuel production. Most of the 5 per cent raise in production of this category since the beginning of the year has been due to a 10 per cent increase in crude oil output.

RETAILING—Sales by retail stores in October were estimated by the Department of Commerce at slightly in excess of $10 billion, or 291 per cent of the 1935-1939 average. The seasonally adjusted index in September stood at 290 and in October, 1946, at 260. Index of prices of goods and services at retail, as estimated by the Bureau of Labor Statistics, for September was at a record high of 164 per cent of the 1935-1939 average and was 12 per cent higher than in September, 1946.

WHOLESALING—Higher wholesale prices for most major commodity groups pushed the Bureau of Labor Statistics index to a new postwar high of 159.2 per cent of the 1926 average in the week ended Nov. 22. Up 0.4 per cent from the previous week the index is now only 4.8 per cent below the all-time high reached in May, 1920. Industrial raw materials and manufactured products also showed gains.

EARNINGS — Durable goods industries, working longer weeks than in any month since the end of 1945, paid a new high in average weekly wages in October, the earnings of $54.72 for each 41-hour week being 67 cents higher than average weekly pay of the preceding month. Weekly earnings in all manufacturing industries also set a new record at $50.97, with average hourly earnings rising to 125.7 cents from the previous month's rate of 124.9 cents or $50.45 a week.



The Index (chart above): Week Ended Nov. 29 (preliminary) 158 Previous Week 171 Month Ago 168 Year Ago 127

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	96.5	96.5	65.5
Electric Power Distributed (million kilowatt hours)	4,983	5,180	5,009	4,448
Bituminous Coal Production (daily av.—1000 tons)	2,148	2,100	2,106	1,086
Petroleum Production (daily av.—1000 bbl.)	5,257	5,275	5,274	4,795
Construction Volume (ENR—Unit $1,000,000)	$116.8	$100.9	$82.2	$32.6
Automobile and Truck Output (Ward's—number units)	82,932	115,197	107,240	77,222

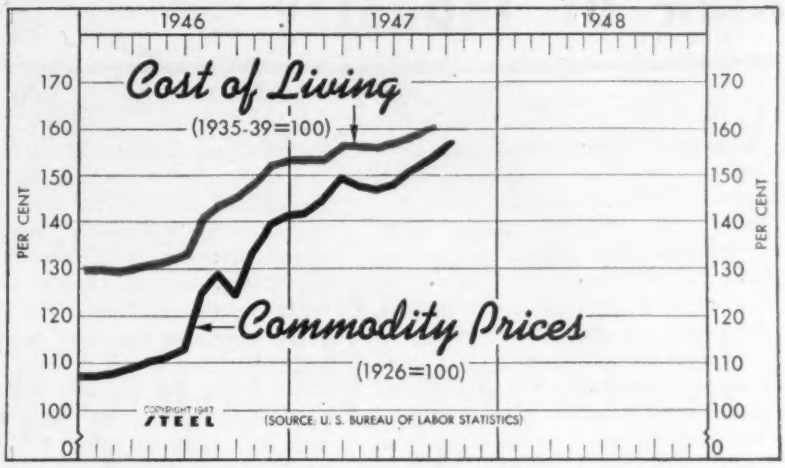
* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

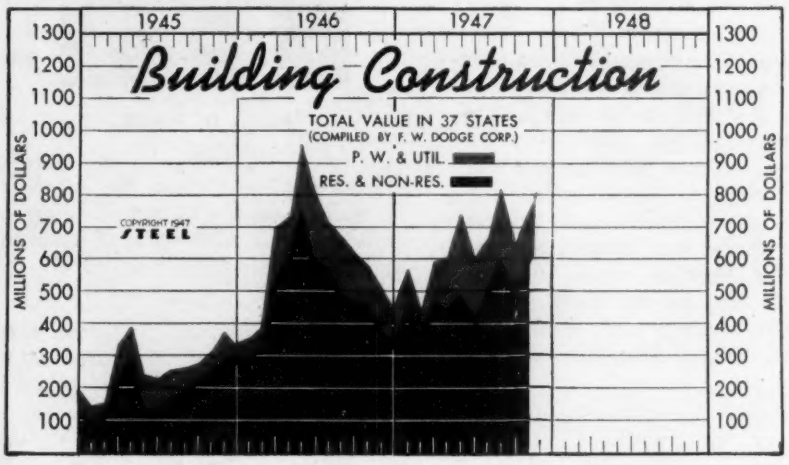
TRADE				
Freight Carloadings (unit—1000 cars)	825†	903	941	661
Business Failures (Dun & Bradstreet, number)	72	79	70	24
Money in Circulation (in millions of dollars)‡	$28,725	$28,595	$28,519	$28,815
Department Store Sales (change from like wk. a yr. ago)‡	+9%	+11%	+7%	+41%

† Preliminary. ‡ Federal Reserve Board.

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1947	1946	1945	1947	1946	1945
Jan.	141.5	104.1	104.9	153.3	129.9	124.1
Feb.	144.5	107.7	105.2	153.2	129.6	126.9
Mar.	149.5	108.9	105.3	156.3	130.2	126.8
Apr.	147.7	110.2	105.7	156.2	131.1	127.1
May	147.1	111.0	106.0	156.0	131.7	128.1
June	148.0	112.9	106.1	157.1	133.3	129.0
July	150.8	124.7	105.9	158.4	141.2	129.4
Aug.	153.6	129.1	105.7	160.3	144.1	129.3
Sept.	157.4	124.0	105.2	....	145.9	128.9
Oct.	....	134.1	105.9	....	148.6	128.9
Nov.	....	139.7	106.8	....	152.2	129.3
Dec.	....	140.9	107.1	....	153.3	129.9
Ave.	....	120.9	105.8	....	139.3	128.4





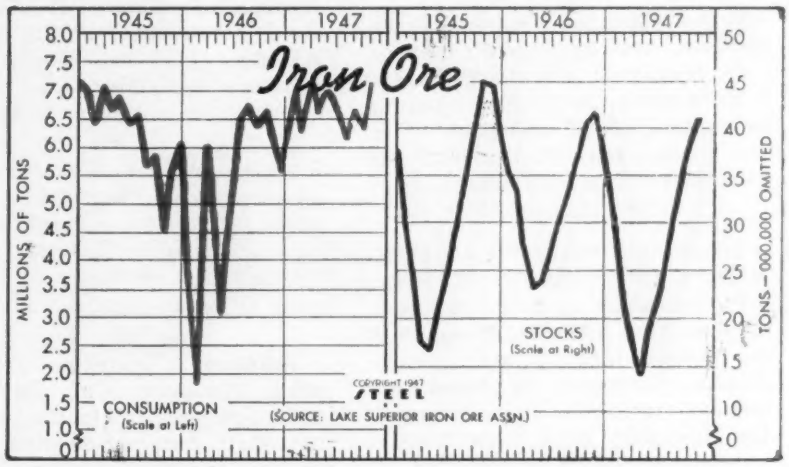
Construction Valuation in 37 States
(Unit—$1,000,000)

	Total	Public Works Utilities		Residential and Non-residential	
	1947	1947	1946	1947	1946
Jan.	571.6	113.9	50.2	457.7	307.3
Feb.	442.2	90.5	64.7	351.6	322.7
Mar.	596.8	122.0	143.6	474.8	554.0
Apr.	602.3	161.4	128.1	441.0	606.8
May	742.8	252.9	197.9	490.0	754.6
June	605.1	185.7	202.5	419.4	605.5
July	660.3	165.9	153.1	494.4	564.9
Aug.	823.2	223.5	184.4	599.7	495.6
Sept.	650.0	141.5	156.4	508.4	463.5
Oct.	793.3	165.9	112.8	627.4	460.4
Nov.	....	....	121.8	....	382.0
Dec.	....	....	115.9	....	341.4
Total	....	....	1,631.4	....	5,858.7

Iron Ore

(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1947	1946	1947	1946
Jan.	7,024	3,719	30,514	35,342
Feb.	6,264	1,748	24,317	33,647
Mar.	6,979	6,021	17,411	27,601
Apr.	6,579	4,769	13,555	23,079
May	6,885	2,990	17,618	23,905
June	6,500	4,995	21,746	26,265
July	6,156	6,460	28,440	30,439
Aug.	6,638	6,738	33,896	34,067
Sept.	6,492	6,380	38,370	37,573
Oct.	7,151	6,625	41,641	40,435
Nov.	....	6,131	.....	41,919
Dec.	....	5,516	.....	37,465
Total	....	62,093	.....	.....



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,910	$15,860	$13,272	$12,059
Federal Gross Debt (billions)	$258.3	$258.4	$259.0	$262.6
Bond Volume, NYSE (millions)	$16.6	$25.7	$21.3	$19.9
Stocks Sales, NYSE (thousands)	3,879	4,990	5,484	4,423
Loans and Investments (billions)†	$64.9	$64.9	$65.0	$57.7
United States Gov't. Obligations Held (millions)†	$37,829	$37,834	$38,632	$37,881

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$76.09	$76.09	$75.41	$64.45
All Commodities†	159.2	158.5	158.0	137.3
Industrial Raw Materials†	176.7	175.8	177.0	155.3
Manufactured Products†	152.2	151.7	150.6	131.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

Harold W. Logan has been appointed manager of sales, Wisconsin Steel Division, International Harvester Co., Chicago. He succeeds the late **B. F. Courtright.** Mr. Logan began his service at Wisconsin Steel Works in 1926 after graduation from Indiana University. In 1937 he was promoted to contact metallurgist, and in 1945 became second assistant superintendent of the metallurgical and inspection department. Recently he was transferred to the general office as sales representative.

—o—

Eastern Stainless Steel Corp., Baltimore, announces election of **Lachlan Mackenzie** as executive vice president of the firm. He formerly served as assistant to the president and as vice president.

—o—

L. P. Richie has been appointed director of purchases for Oliver Corp., Chicago. Assistant secretary of the company since 1936, he will now co-ordinate and supervise plant-wide purchasing activity and policies at the farm implement manufacturer's general offices in Chicago.

—o—

T. R. Walker has been elected vice president, Warren Foundry & Pipe Corp., New York, succeeding the late **J. H. Morrison.** Mr. Walker formerly had been general superintendent of pipe plants. **John F. Benjamin** has been elected general sales manager.

—o—

Appointment of a new sales representative for Washington state has been announced by Rapids-Standard Co. Inc., Grand Rapids, Mich. **Lloyd G. Backart,** formerly with Rapids-Handling Equipment Co., Grand Rapids, has represented the company in the Northwest since November, the effective date of his appointment. He also will cover the company's upper Idaho sales territory. He will work under the regional sales supervision of **Plin Mears** of Pomona, Calif., who recently was appointed western regional manager for Rapids-Standard Co. Inc.

—o—

W. E. Day has been appointed director of research, Mack Trucks Inc., New York. In assuming his new duties, Mr. Day relinquishes the post of chief metallurgist for Mack Trucks, as well as that of general foundry superintendent. In 1912 he joined the International Motor Co., now a part of Mack-International Motor Corp., as a special apprentice, and a year later became foreman of the chassis assembly, and then foreman over motor assembly, motor test, chassis assembly and road test. During this period he became occupied with metallurgy, and after several years' study at Harvard, he became an instructor in the course, eventually setting up Mack's first chemical laboratory for checking materials, out of which he evolved the company's present-day chemical and metallurgical laboratories.

—o—

Arthur G. Lambert has been elected vice president and manager of the Export Division, Atlas Steels Ltd., Welland, Canada. Associated with the steel business since 1919 in various production, metallurgical, sales and executive capacities in England, United States and Canada, he joined Atlas in 1940 as export manager. Prior to that he had been with the Canadian Division of Jessop Steel Co., Washington, Pa.

—o—

Gerard J. Eger has been elected secretary, International Harvester Co., Chicago, to succeed **Sanford B. White,** who will retire Dec. 31. Mr. White joined the company in 1912. Mr. Eger, who has been assistant secretary since 1941, began his service with the company in 1925.

—o—

Ralph Andrews has been elected president, Morse Mfg. Co. Inc., Syracuse, N. Y. He succeeds **J. Mott Morse,** founder of the firm, who has retired. Mr. Andrews joined the company as general manager in 1943.

—o—

Gardiner S. Platt has joined Indian Motocycle Co., Springfield, Mass., as assistant to the president. Mr. Platt, formerly director of sales at Simplex Mfg. Co., will be in charge of factory-dealer relations at Indian Motocycle Co.

—o—

Frank E. Waterman has been appointed chief engineer of the Youngstown district operations of Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp. He succeeds **John Bates,** who resigned to join the Koppers Co. Inc., Pittsburgh. Mr. Waterman has been assistant to the chief engineer of Carnegie-Illinois Steel Corp.

—o—

Carpenter Steel Co., Alloy Tube Division, Union, N. J., announces appointment of **John A. Deitrich** as

HENRY D. SHARPE

manager of the division. He succeeds **E. W. Bachman,** who will continue to work with the Alloy Tube Division in an advisory capacity.

—o—

Henry D. Sharpe, president and treasurer of Brown & Sharpe Mfg. Co., Providence, R. I., has resigned as treasurer of the company, which position he has held since 1904. He will continue as president. **Frederick P. Austin Jr.** succeeds Mr. Sharpe as treasurer. Formerly serving as assistant treasurer since 1941, Mr. Austin has been a director of the company since 1945. He has also been named a vice president.

—o—

Stuart W. Cragin, vice president of J. P. Morgan & Co. Inc., has been elected to the board of directors of General Steel Castings Corp., Eddystone, Pa. He succeeds **Charles D. Dickey,** resigned.

—o—

W. S. Kendrick, for the past 25 years vice president in charge of sales, General Electric X-Ray Corp., Chicago, subsidiary of General Electric Co., has joined the president's staff of the subsidiary company, where he will handle special assignments. He has been connected with the General Electric organization for 40 years, and while with the parent company, he headed, for several years, the special products department. **John H. Smith,** who joined General Electric X-Ray Corp. recently as assistant to the president, has been named vice president in charge of the newly-created Marketing Division.

—o—

A. Pitann has been appointed vice president in charge of sales, Precision

HARPER fastening NEWS

HAVE YOU A CORROSION PROBLEM?

New Harper Computer Will Show Proper Alloy Bolt to Use

FREE
ON REQUEST TO EXECUTIVES, ENGINEERS AND OTHERS INTERESTED IN FASTENINGS

The amazing new Harper Computer provides a rapid means of selecting the best non-ferrous or stainless steel alloy fastening to resist any one of numerous conditions causing corrosion. It operates on the slide rule principle and qualifies as Excellent, Good, Fair, or No Good, 13 rust and corrosion resisting metals or alloys in approximately 142 corrosive environments. To operate it, simply, select the name of the corrosive condition which most nearly matches your own. Slide this name until it is directly opposite the arrow. Look into the adjoining column for a set of symbols which indicate the non-ferrous or stainless steel alloy best suited to resist the corrosive condition in question. For example, silicon bronze may be indicated for condition A, Monel metal for condition B, etc.

The Harper Computer is an indispensable working tool for anyone concerned with selecting alloy fastenings to meet various corrosive conditions. Write for one, now.

Harper Bolts RESIST CORROSION

Harper manufactures and stocks a vast variety of bolts, nuts, and other fastenings in all of the commercial rust and corrosion resisting alloys . . . brass, silicon bronze, naval bronze, Monel metal, and Stainless steels. Here, you are almost sure to find exactly the fastening you need.

If you have a difficult corrosion problem—one not fully answered by the Harper Computer—submit it to the Harper engineers. These men are specialists in the manufacture and use of rust and corrosion resisting fastenings. They'll be glad to study your problem and suggest a solution. No obligation.

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HARPER SPECIALIZES IN EVERLASTING FASTENINGS

Scientific Co., Chicago. **Richard Bergen** has been named sales manager. **Ronald Jenkins,** formerly with Will Corp., succeeds Mr. Bergen as New York representative. **Fred Hermann** joins the staff as director and assistant to the president. **B. J. Seldess** has been appointed treasurer of the company. **T. Ryan,** formerly of Adler Mfg. Co., Louisville, succeeds **R. H. Eddy** as personnel manager. Mr. Eddy has been named director of purchases.

—o—

Edward K. Davis has resigned as director and president of New Aluminum Ltd., Montreal, Canada, which positions he has held since its organization in 1928. **Nathaniel V. Davis** has been elected to succeed Mr. Davis.

—o—

Harry J. Williams, formerly associate editor, McGraw-Hill Publishing Co. Inc., has joined Columbia Steel Co., U. S. Steel Corp. subsidiary, as assistant to the director of public relations.

—o—

H. A. Pratt has been appointed parts and service manager of Davey Compressor Co., Kent, O. He formerly had been superintendent of the Kent plant.

—o—

Andrew Van Echo, formerly technical service representative and chief inspector for Joslyn Stainless Steel Co., Ft. Wayne, Ind., has joined the Wm. E. Pratt Mfg. Co., Joliet, Ill., as metallurgical engineer.

—o—

Borg-Warner Co., Chicago, has named **Joseph A. White** as works manager of the Chicago plant, Ingersoll Steel Division, and **Milo F. McCammon** as works manager of the Kalamazoo, Mich., plant of the division.

—o—

J. J. Mellon, chief engineer of the Allen-Bradley Co., Milwaukee, has been elected chairman of the industrial control section, National Electrical Manufacturers Association. **A. R. Johnson,** merchandising sales manager, Cutler-Hammer Co., Milwaukee, has been named chairman of the knife and enclosed switch section of the association, and **J. F. Roberts,** manager, hydraulic turbine department at Allis-Chalmers Mfg. Co., also Milwaukee, has been re-elected chairman of the NEMA hydraulic turbine section.

—o—

In recognition of outstanding wartime production of tracked amphibian vehicles, (LVT's), **Paul L. Davies,** president, Food Machinery Corp., San Jose, Calif., has been presented, in behalf of the company, the Certificate of Merit by the Navy Department.

—o—

Charles K. Rieger has been named manager, Heating Device & Fan Divisions, General Electric Co., Schenectady, N. Y. He formerly had been commercial engineer in the Home Laundry Equipment Division.

—o—

Eric E. DeMarsh has been named sales manager for Burndy Engineering Co. Inc., New York. He has been with the firm since 1936.

—o—

Clare E. Briggs has been assigned the full responsibilities of assistant general sales manager, Packard Motor Car Co., Detroit, and its subsidiaries in the United States and Canada. Previously assistant general sales manager in charge of eastern United States and Canada, Mr. Briggs' scope of activities is broadened to include direct supervision of all Packard regional and zone sales offices, and of the various departments of the Central Office Sales Division. **Elliott Taylor** has resigned as assistant general sales manager for western United States.

—o—

Nathan S. Addlestone, Addlestone & Co. Inc., Sumter, S. C., has been elected president of the Southern Chapter, Institute of Scrap Iron & Steel Inc., to succeed **W. Alec Rawls** of Alec Rawls Wrecking Co. Inc., Rocky Mount, N. C. **Leo J. Kellheher,** Southern Converting Co., Greensboro, N. C., has been elected first vice president; **Morris Brenner,** Brenner Iron & Metal Co., Winston-Salem, N. C., second vice president; **Sol I. Levin,** Levin Bros., Burlington, N. C., third vice president; and **Hyman Helbein,** Southern Metals Co., Charlotte, N. C., secretary-treasurer.

—o—

The Federal Trade Commission announces appointment of **Dr. Corwin D. Edwards,** professor of economics at Northwestern University, as its chief economist and director of its bureau of industrial economics, succeeding **Col. William H. England,** who retired in September.

—o—

H. T. Cavanaugh has been elected to the board of Dart Truck Co. of Kansas City, Mo.

—o—

Ernest L. Gartner, manager, Metal & Ore Division, Grasselli chemicals department, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has retired after 43 years with the company. With Mr. Gartner's retirement, the Metal & Ore Division has been dissolved, and its functions will be handled by the regular production and sales organization of the Grasselli department.

—o—

Robert B. Franklin has been appointed manager of the Ipswich, Mass., fixture plant, Sylvania Electric Products Inc., New York. Previously manufacturing superintendent and production control supervisor, Mr. Franklin in his new capacity will direct manufacturing processes and production activities of the lighting fixture plant. Before his association with Sylvania Electric in 1942, he was connected with Dennison Mfg. Co.

—o—

The Buick Division of General Motors Corp., Detroit, announces ap-

GEORGE H. LYNN

Has resigned from Axelson Mfg. Co., Los Angeles, to accept the position of Western Division sales manager, Niles Tool Works, with headquarters in Chicago. Noted in STEEL, Dec. 1 issue, p. 86

R. J. SOUTHWELL

Resigned from American Chain & Cable Co. Inc., Bridgeport, Conn., will devote his time to his new development, a process for manufacture of wire fabrics. Noted in STEEL, Dec. 1 issue, p. 82

INCREASING PRODUCTION EFFICIENCY WITH WHISTLER ADJUSTABLE DIES

LEADING STOVE MANUFACTURERS

Speed More Production at Less Cost

PERFORATING, notching, slotting and rounding jobs are set up in a hurry with Whistler Adjustable Dies. Materials up to ¼" mild steel are easily pierced. Accuracy is assured. Work in practically any type press. Major savings are realized through continued use of the same dies, rearranged to new set-ups. In a matter of minutes units can be added from stock while sizes and shapes not required are set aside for future use.

Standard size punches and dies... 1/32" to 3"...are shipped promptly. It takes but a short time to make up special shapes and group dies to your order.

S. B. WHISTLER & SONS, INC.
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Exploded view of a Whistler Adjustable Punch and Die Unit. Parts fit firmly. No wabble or slipping in use.

Over 1000 manufacturers, known for their production efficiency, use Whistler Adjustable Dies. Write for your Whistler catalogs...know the facts.

pointment of **Raymond J. McGovern** as Buick manager of the Philadelphia zone, succeeding **H. K. Poffenberger,** recently made Buick's central regional manager. Mr. McGovern, formerly zone manager in Buffalo, has been succeeded by **Weldon E. Young,** who has been assistant manager of the New York zone.

—o—

Warren B. Miles has retired as manager of the Philadelphia warehouse of Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va. He has held this position for the past 30 years, and is succeeded by **David L. Kendrigan,** who has been manager of the Boston warehouse. **F. S. Neal,** manager, Wheeling Sales Division, will assume Mr. Kendrigan's duties at Boston. At Wheeling, **Henry T. Stewart** has been promoted to the position of Wheeling Sales Division manager, succeeding Mr. Neal.

—o—

Benjamin E. Shereshaw and **Charles E. Kinney** have joined the firm of Junior Motors Co., Philadelphia.

—o—

Four new appointments have been announced by the apparatus department, General Electric Co., Schenectady, N. Y. **W. V. O'Brien** has been named assistant general manager of sales; **R. M. Darrin** of New York, manager of Central Station Divisions, succeeding Mr. O'Brien; **J. C. Miller,** assistant to the manager of sales; and **H. P. Bish,** manager of Aircraft, Federal & Marine Divisions.

—o—

James D. Edmunds Jr., of Baltimore, has been elected chairman of the Construction Industry Advisory Council, Chamber of Commerce of the United States. Mr. Edmunds, a practicing architect, is past president of the American Institute of Architects.

—o—

Robert C. Elliott, industrial editor of the *San Francisco News,* has been appointed executive assistant to **Henry J. Kaiser,** industrialist. In this newly-created position he will manage Mr. Kaiser's eastern headquarters in New York, which deals with 28 Kaiser industries, among which are Kaiser-Frazer Corp., Kaiser Steel and Kaiser Aluminum.

—o—

Paul Learner of Learner Co., Alameda, Calif., has been elected president of the Northern California Chapter of the Institute of Scrap Iron & Steel Inc. He succeeds **Marshall A. Shapiro,** California Metals Co., Oakland. Other officers elected include: Vice president, **Frank Malley,** Associated Iron & Metal Co., Oakland; secretary-treasurer, **Harold Levin,** Salco Iron & Metal Co., San Francisco.

—o—

R. Palmer Hollister, controller of Volco Brass & Copper Co., Kenilworth, N. J.; **Duncan P. Lowe,** controller, William Bros. Boiler & Mfg. Co., Minneapolis; and **Russell K. Steffey,** controller of the Fort Pitt Bridge Works, Pittsburgh, have been elected to membership in the Controllers Institute of America.

—o—

Arthur P. Hall has been named assistant director of public relations and advertising for Aluminum Co. of America, Pittsburgh. He has been district sales manager for the company's Washington offices for the past four years, and will be succeeded in that position by **R. A. Learnard,** assistant district sales manager in Washington. Mr. Hall became associated with Aluminum Co. of America in 1929. He was made manager of the Washington district office in 1943, and was named an assistant secretary of the company the same year.

—o—

Dr. M. M. Brubaker has been promoted to director of research for the chemical department, and director of services for the experimental station, for E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. **Dr. P. L. Salzberg** has been promoted to laboratory director of the experimental station.

—o—

A. A. Way, for some months acting plant manager of the Chevrolet Motor Division plant, General Motors Corp., which is located at Tonawanda, N. Y., has been appointed manager of the plant, filling a vacancy created by the retirement of **A. G. Gulliver,** a General Motor employee since 1908. Mr. Way joined General Motors Corp. in 1919, at the Detroit Gear & Axle Division.

—o—

Charles E. Carll has been appointed director of public relations of Ford Motor Co., Dearborn, Mich. He joined Ford in 1942, remaining there until late 1943, and returning in the fall of 1944 as the head of the Ford News Bureau, a post which now will be taken by **John L. Rose** of the news bureau staff.

—o—

Pittsburgh Limestone Corp., subsidiary of U. S. Steel Corp., announces appointment of **John G. Patterson II** as assistant to president, and **Hugh C. Farrell** as supervisor of industrial relations. Mr. Patterson, who became secretary and general attorney for

HARRY D. MYERS

Appointed to position of executive vice president, director and general manager of the eight plants of Standard Products Co., Detroit. Noted in STEEL, Dec. 1 issue, p. 82

Pittsburgh Limestone in 1946, will continue those responsibilities. In his new position as assistant to the president, he becomes head of the industrial relations department. Before joining the company in 1946, he was assistant secretary of Carnegie-Illinois Steel Corp., U. S. Steel subsidiary. Mr. Farrell first became associated with U. S. Steel Corp. in 1942 as statistician for Michigan Limestone & Chemical Co., Rogers City, Mich., later assuming the responsibilities of the industrial relations department of the company.

—o—

Nicholas C. Clausen has been elected president of the Clausen Iron Co. Inc., Albany, N. Y. He succeeds his father, the late **Holger S. Clausen,** and is a grandson of the first **Nicholas C. Clausen,** founder of the firm.

—o—

Gorton T. Wood, treasurer of the Savage Arms Corp., Utica, N. Y., has been elected a director of the company. He has been associated with the firm for 15 years.

—o—

N. A. Carlson Sr. has been named president and chairman of the board of Erie Meter Systems Inc., Erie, Pa. **L. F. Smith** has been promoted from superintendent to vice president and general manager of the company.

—o—

Ralph I. Peterson has been named San Francisco representative for U. S. Steel Supply Co., Chicago, U. S. Steel Corp. subsidiary.

—o—

Thomas H. Pipkin has been appointed special sales representative on commercial non-aviation products, Texas Engineering & Mfg. Co., Dallas, Tex. He had been connected with the Dear-

WILLIAM W. SCULL

Has been named general manager of manufacturing services, B. F. Goodrich Co., Akron. Noted in STEEL, Dec. 1 issue, p. 86

THOMAS G. CAREY

Named purchasing agent, production parts and sub-contracting, Weatherhead Co., Cleveland. Noted in STEEL, Dec. 1 issue, p. 82

JAMES C. ESTERLINE

Appointed general manager of L. G. S. Spring Clutch Corp., Indianapolis, division of Curtiss-Wright Corp. STEEL, Dec. 1 issue, p. 82

born Stove Co., and throughout the war headed the Machine Tool & Equipment Division, War Production Board, in the Dallas regional office.

—o—

Philip Trent and **H. Bennett McDonald** have joined the regional sales staff of the Appliance Division, Yale & Towne Mfg. Co., New York.

—o—

Gordon P. Lovell has been promoted to the position of assistant to the sales manager, International Business Machines Corp., New York. He is succeeded as sales manager of District No. 1 by **McLain B. Smith,** previously electric accounting machine manager in Philadelphia.

OBITUARIES . . .

Alfred Marchev, president, Aircraft Screw Products Co. Inc., Long Island City, N. Y., and former chairman of the board, Republic Aviation Corp., Farmingdale, L. I., died Nov. 28. He played an important part in the war as president of Republic, beginning in 1943, and delivered to the armed forces of the United States and its allies, 15,000 P-47 Thunderbolt fighter planes.

—o—

Floyd O. Tanner, 64, a former vice president, General Motors Corp., Detroit, died Nov. 27. He entered the automobile industry in 1911 with the Hudson Motor Car Co. He later became manager of the Chevrolet Gear & Axle Division, and in 1937, vice president in charge of personnel. In 1940, Mr. Tanner resumed directorship of the Manufacturing Division.

—o—

Henry J. Warth, 55, head of plant protection department, Garwood, N. J., of Aluminum Co. of America, died Nov. 25.

—o—

Benjamin Riesner, 75, president, Benjamin Riesner Inc., New York, roofing and sheet metal company, died recently in New York.

—o—

Charles L. Axline, mechanical engineer specializing in tool and die design, died Nov. 26 at his home, East Cleveland, O. At the time of his last illness, Mr. Axline was a designer for the Clark Controller Co., Cleveland.

—o—

Allen Bassett, 75, treasurer, Euclid Crane & Hoist Co., Cleveland, for many years, died at his home in Cleveland Hts., O., Nov. 26.

—o—

William Thurman, 87, retired Plymouth, Wis., business man, died Nov. 22. He organized and built the Plymouth Foundry & Machine Co. in 1905.

—o—

Howard F. Parkerton Sr., 62, manager, Los Angeles sales office of Farrel-Birmingham Co. Inc., died recently following an operation.

—o—

Edgar Masters, 73, secretary-treasurer, Follansbee Steel Corp., Pittsburgh, died Nov. 29.

—o—

Donald R. MacAllister, president, Syracuse Heat Treating Co., Syracuse, N. Y., died recently. He was past president of the Central New York Chapter of American Society for Metals.

—o—

Louis A. Rouviere, 71, former manager, Manlius Mfg. Co., Syracuse, N. Y., and a past president of the National Metal Trades Association, died recently in Syracuse.

—o—

Cummings C. Chesney, 84, former vice president, General Electric Co., Schenectady, N. Y., died at his home in Pittsfield, Mass., Nov. 27. He had been awarded the Edison Medal by the American Institute of Electrical Engineers in 1921, and was later elected president of that organization.

—o—

Ralph H. Page, 70, retired senior vice president, Truscon Steel Co., New York, died Nov. 29 in White Plains, N. Y. He retired in 1929. Mr. Page had been in charge of foreign trade for the company.

—o—

Brockway Dickie, 56, secretary and director of sales, Union Steel Products Co., Albion, Mich., died Nov. 23. He had been with the company 35 years.

—o—

David Berger, 55, owner, Berger Electric Motors Co., Rochester, N. Y., died Nov. 24 of a heart attack, suffered while en route by plane from Los Angeles to New York.

—o—

Webster Tallmadge, 64, retired president, Webster Tallmadge Co. Inc., New York, died Nov. 24.

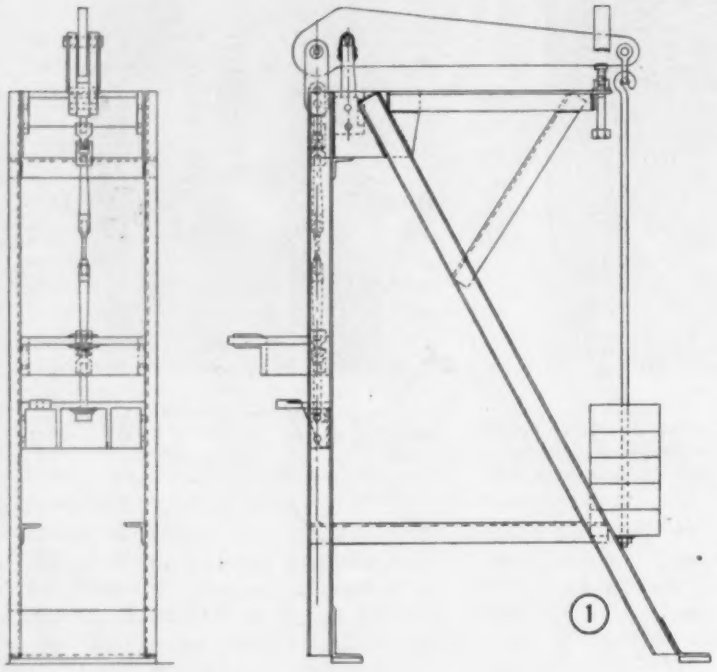
—o—

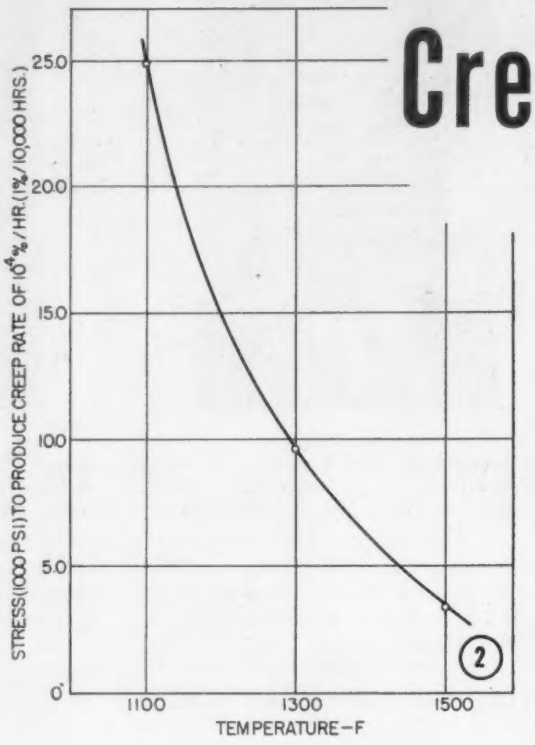
Francis H. Fenn, 49, president, American Bantam Car Co., Butler, Pa., died in that city Nov. 30. Prior to joining American Bantam, he had held executive positions with Willys-Overland Motors Inc., and divisions of General Motors Corp.

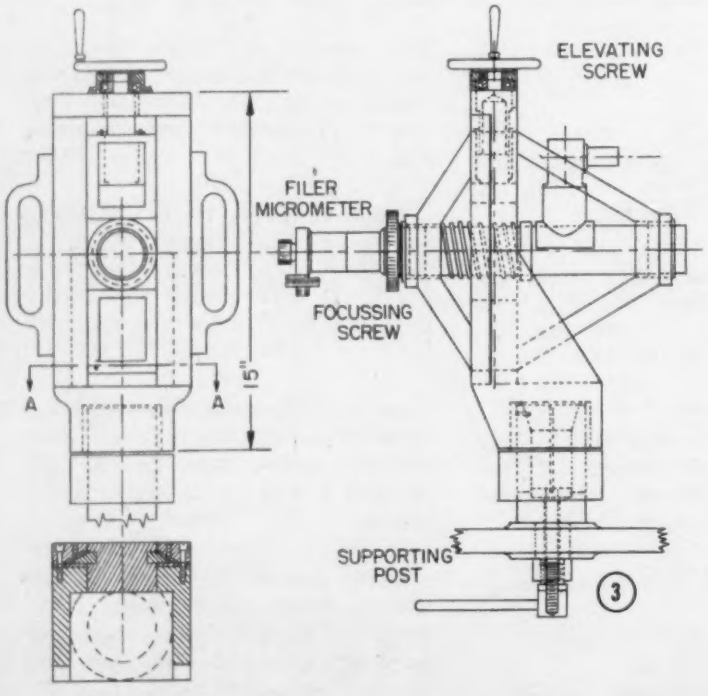
—o—

Harold B. Gaylord, 67, sales manager in Philadelphia for Carpenter Steel Co., died Nov. 26.

Creepan







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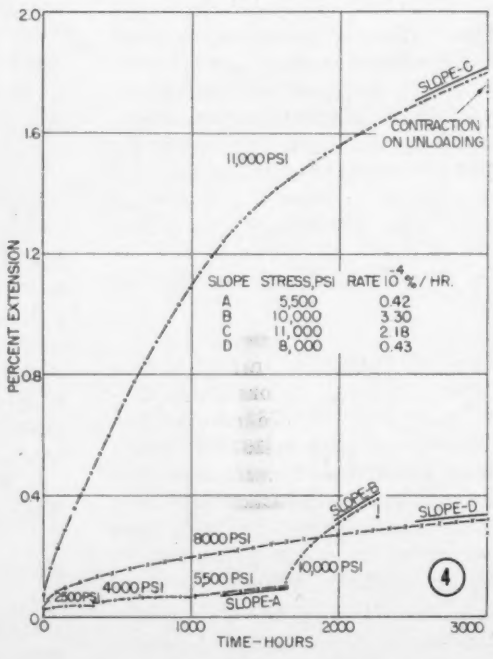
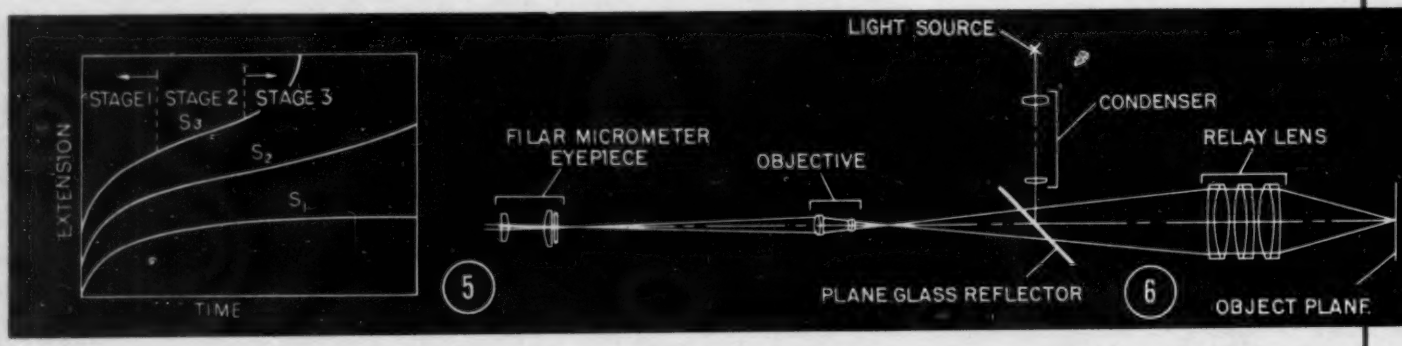




pand Creep-Rupture Testing

Results of experience with two important metallurgical tools are reported and evaluated by the authors. This review includes description of specimens, temperature controls, test stands, general procedures and use of data

By G. V. SMITH, W. G. BENZ, R. F. MILLER

Research Laboratory
United States Steel Corp.
Kearny, N. J.

IN PRINCIPLE, the creep test is simple—a specimen is heated to the desired temperature, a constant load applied (generally by dead weights and a lever), and the resulting slow extension measured periodically. In practice, however, it requires great experimental care because the extension of interest is very small, of the order of 0.00001 to 0.0001 per cent per hour.

If results of creep or creep-rupture tests are to be significant, careful attention must be paid to all experimental details of preparation of the specimens, uniformity and control of temperature, and measurement of the several properties involved in the contemplated use of the metal.

When stress is high there are three fairly distinct stages of elongation: (1) An initial period of rapid but diminishing rate; (2) a period of substantially constant rate; (3) a period of increasing rate which is a portent of eventual failure. Rate of extension during the second stage is utilized in estimating creep-strength, defined usually as the stress which produces a creep-rate of 0.1 per cent per 1000 (or occasionally, per 10,000) hours. Such a small rate is assumed to persist during the service life of the metal. When the rate continuously diminishes in course of the test, as sometimes happens, creep strength is commonly based upon the observed rate over the last 500 hours. Consequently in the creep test, the third stage of the typical curve does not generally occur, except possibly in preliminary experiments, because the stress chosen is purposely made small enough to prevent it; but the possibility of its occurence at some subsequent time must be borne in mind.

In the creep-rupture test, frequently called the stress-rupture test, the third stage of the creep curve does occur, for, as its name indicates, this test is continued to failure. In fact, the only difference between the creep test and the creep-rupture test is that the latter is conducted at sufficiently high stress so that the fracture results during test.

Prior to machining the specimen, a blank of bar stock at least 1 inch in diameter or thickness and 8 inches long, is heat treated according to desired practice, and a 1/2-inch coupon is then cut from each end to serve for metallographic examination of the initial structure. The remaining 7 inches are machined accurately to the specifications.

To measure extension of the specimen during test, a microscope is sighted upon reference marks engraved on polished platinum beads attached on extensometer units which are secured to the shoulders of the specimen. The platinum beads are brazed or welded on the arms of the unit, which when thus mounted, refer the extension between the shoulders to a central point for observation. From periodic observations of a reference mark on each of the platinum beads the extension-time curve is constructed. Since the extensometer units are mounted on the

Fig. 1—Creep testing stand

Fig. 2—Variation of creep strength of 18-8 type 316 steel with temperature

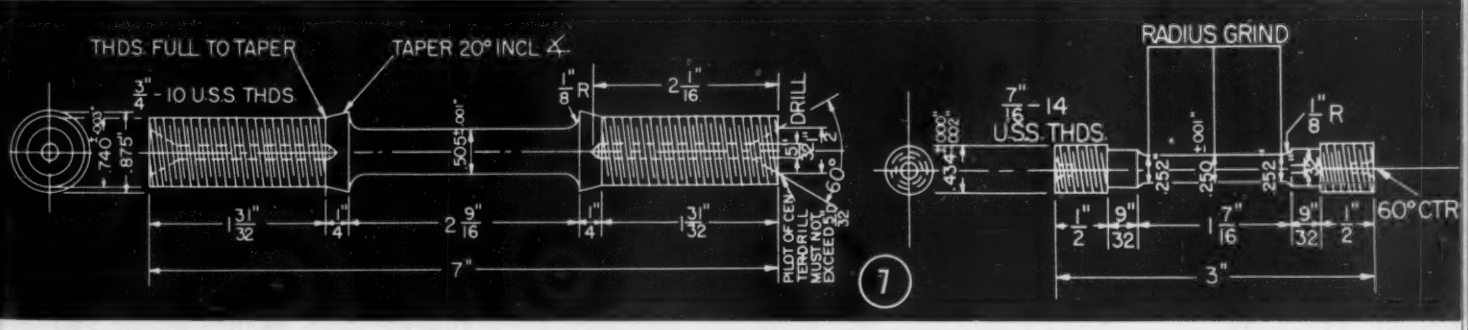
Fig. 3—Creep microscope mounting

Fig. 4—Extension time plots for 18-8 (AISI type 316) steel at 1300° F

Fig. 5—Schematic illustration of effect of stress on "creep curve" at constant temperature. Stress S_3 is greatest, S_1 least

Fig. 6—Optical system of creep microscope

Fig. 7—Dimensions of test specimens. Left—Creep test; right—rupture test



shoulders of the specimen, the measured elongation includes that which occurs in the fillets; this however has been shown to be quite small.

Temperature must be accurately controlled during the creep test for two reasons: First, because it exerts a powerful effect on creep strength; second, because the magnitude of periodically observed extension is of the same order as that produced by a change of temperature of 2° F.

Creep furnace consists of heating elements wound on a refractory tube enclosed in a casing of chromium-plated seamless brass tubing to minimize radiation. The ends, one of which is removable, are insulating disks, and thermal insulation is used between the heating unit and the casing. A metal sleeve inside the tube and held centrally by means of top and bottom spacers promotes uniformity of temperature over the gage length of the specimen.

Control thermocouple is located at the heating elements in a groove cut on the side of the tube and is brought out through the top disk. Using a suitable controller with this couple, the specimen is maintained within plus or minus 2° F at temperatures up to 1100° F plus or minus and within 3° F at temperatures from 1100 to 1500° F except for unusual occurrences. Temperature uniformity over the central 3 inches of the furnace is plus or minus 1° F from 850 to 1100° F and plus or minus 2° F from 110 to 1500° F.

Checking uniformity of temperature over the gage length of the specimen is made with five newly-calibrated thermocouples (22 gage) spaced along a dummy specimen identical to the test specimen assembly which has been mounted and installed in the furnace just as for regular testing. Three thermocouples are spaced along the reduced section, the other two inserted through the pull-rods to the shoulders of the specimen as in a regular test. Tips of three thermocouples spaced along the reduced section are inserted in small holes drilled into the center of the specimen and are held in place by fastening a wire around the thermocouple and specimen. Ends of the five thermocouples are connected through a cold junction head to a selector switch.

During actual test, two thermocouples are used, one through the bottom and the other through the top pull rod extending into the shoulders of the specimen. In all cases, the specimen is brought to the test temperature and maintained there for about 20 hours before applying stress.

Measuring the Extension: Extension of interest in the creep test is of the order of 0.1 to 1.0 per cent per 10,000 hours (respectively 0.00001 to 0.0001 per cent per hour). When it is considered that this information is to be got in a test of relatively short duration—3 to 4 months—it is evi-

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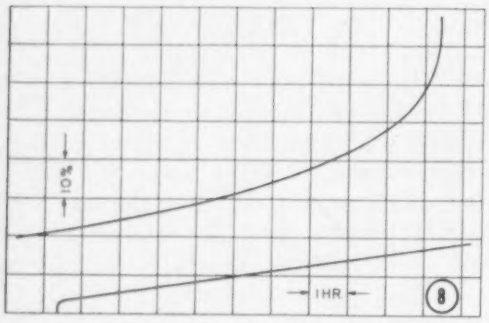
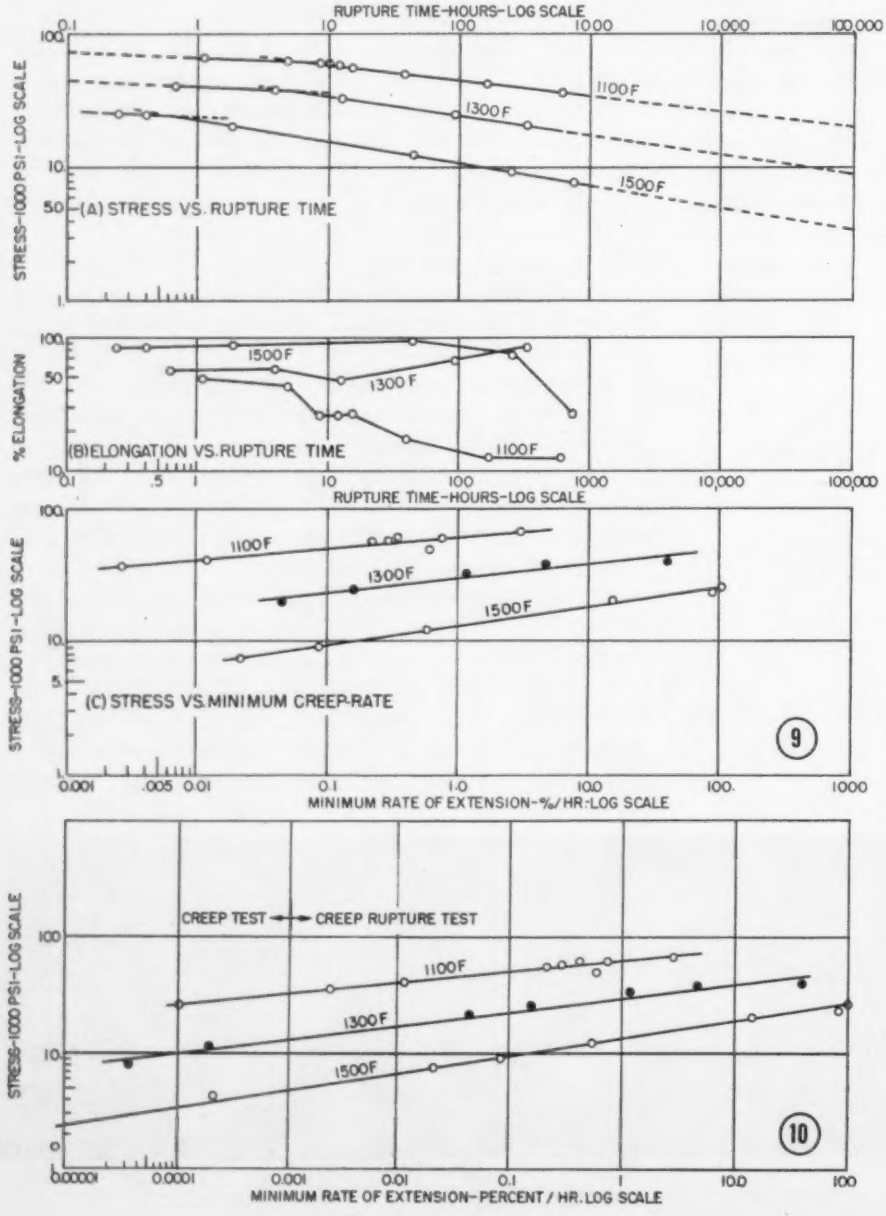


Fig. 8—Autographic strain-time record of creep rupture test

Fig. 9—Variation of (top) stress for rupture, (center) elongation, with rupture time, and (bottom) stress with minimum creep rate of 18-8 *type* 316 *steel at* 1100, 1300 *and* 1500° *F*

Fig. 10—Correlation of creep and creep-rupture test data for 18-8 *type* 316 *steel*



DUCTILITY OF Steels FOR WELDED STRUCTURES

Results of research sponsored by Union Carbide and Carbon Research Laboratories described by Dr. A. B. Kinzel in his Campbell Memorial Lecture presented before this year's Metal Congress. Digest of this important paper is given here

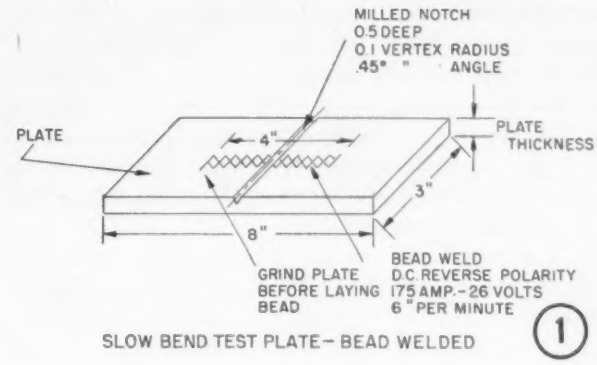
WHETHER or not steel in a welded structure exhibits ductile behavior depends on stress distribution, rate of loading and temperature, as well as the metallurgical condition of the steel. The criterion of ductility with respect to steel behavior is the ability to flow plastically under those imposed conditions.

The notched slow bend specimen described appears to be a satisfying analogue to service performance when lateral contraction parallel to and below the base of the notch is used as a measurement of ductility, with the test performed at the lowest temperature anticipated. That specimen, Fig. 1, is a simple beam 3 inches wide, 8 inches long, of plate thickness, with 0.01-inch radius, 45-degree transverse notch 0.05-inch deep. The specimen is placed in a special jig, Fig. 2, with a 4½-inch span, notch side down, with the notch beneath the ram, and tested statically at 1 inch per minute ram motion. It may comprise a longitudinal weld bead.

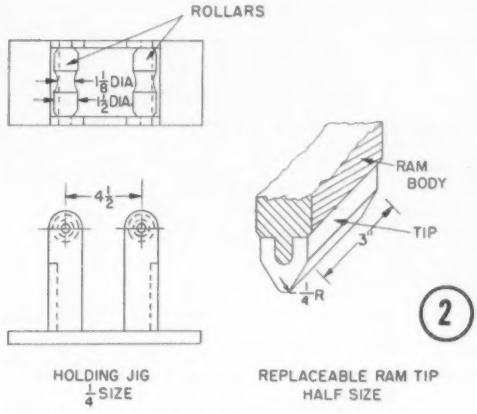
The notched slow bend specimen with longitudinal weld bead permits variation of welding conditions and techniques, comprises plate thickness, and contains all heat-affected zones in the notched condition. It is possible to prepare and test a "platform" specimen directly from a steel heat in less than 4 hours from teeming to final result.

Among the metallurgical factors, Dr. Kinzel pointed out, each of the following contributes to the final integrated result: (a) Melting history of the steel is of great importance. (b) Direction of rolling relative to the test specimen has no effect on the embrittling temperature. (c) Carbon raises temperature at which embrittlement occurs for a given strength, whereas alloys lower the temperature at which embrittlement occurs. (d) Large grain size and high hardness tend to raise the embrittling temperature, but these effects are far from quantitative. (e) Straining increases embrittling temperature slightly, and strain aging may or may not increase it markedly, depending on the steel in question.

According to the author, welding invariably results in raising embrittling temperature. Minimum



SLOW BEND TEST PLATE – BEAD WELDED (1)



SLOW BEND TEST (2)

Fig. 1 — Notched slow bend test specimen

Fig. 2 — Jig for slow bend test

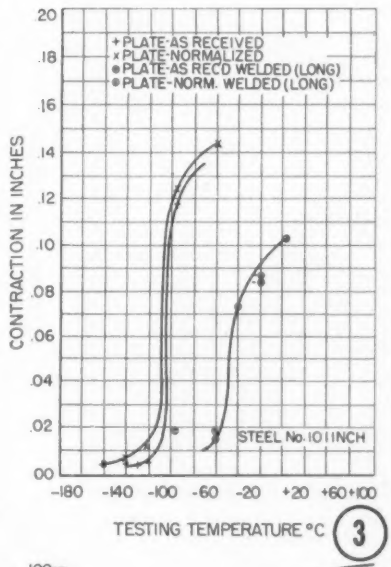


Fig. 3 — Testing temperature vs. lateral contraction. Commercial steel No. 10, 1-inch plate. Note: 0.03-inch lateral contraction equals 1 per cent

(3)

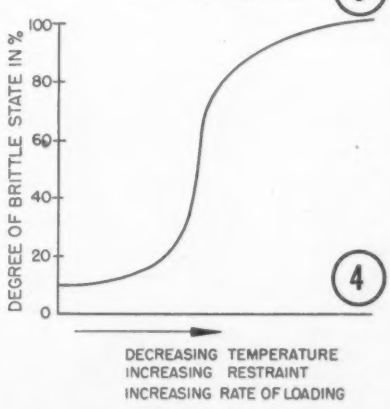


Fig. 4—Effect of various factors on degree of brittle state in steels

(4)

effect on embrittling temperature results from high current and high speeds of welding. Furthermore, the temperature level of embrittlement after welding is higher for carbon steels than for alloy steels at a given strength level. Temperature level of embrittlement after welding is generally but not always higher for material welded in the as-received vs that welded in the normalized condition. Suitable heat treatment after welding tends to restore the initial lower embrittling temperature.

For a criterion of service performance, it is suggested that the specimen in question be used with a lateral contraction of 1 per cent minimum as a limit, and that the test temperature for indoor and marine service be set at −20° C, for outdoor service at −40° C, and for low temperature service in the chemical industries at 10° C lower than the anticipated minimum service.

All of the steels examined exhibit ductile behavior at some testing condition and brittle behavior at some other testing condition, temperature being the main factor with which we are concerned in this series of tests.

Lowering of ductility with lowering of temperature is in no instance a proportional relationship. In many of the steels the lowering of ductility with temperature is gradual over a wide range of temperature. In many others slight lowering of ductility occurs as the temperature is lowered until some rather narrow critical range of temperature is reached when the loss of ductility is extremely rapid with lowering temperature.

This is now a commonly recognized phenomenon, and a typical case is set forth in Fig. 3. It is again amply demonstrated that the temperature at which the material may be classified as brittle, is a complex function of the rate of loading and the stress distribution, particular restraint. Increased rate of loading increases the temperature at which brittle behavior occurs, as does increased restraint. All this is summarized in Fig. 4.

The metallographic condition is likewise an important factor for a steel of any given nominal analysis. Study of the data as illustrated in Fig. 5 shows that, by and large, normalizing lowers the embrittling temperature from that of the as-rolled condition. This is not necessarily true in each specific instance. Plate in the as-rolled condition may have finer grain size than the normalized plate, and may have an internal stress system with an important compressive component at right angles to the notch which decreases restraint and thus provides embrittlement at a lower temperature. In the case of welded plate there is a greater difference between material as-rolled or normalized before welding. This is shown in Fig. 5.

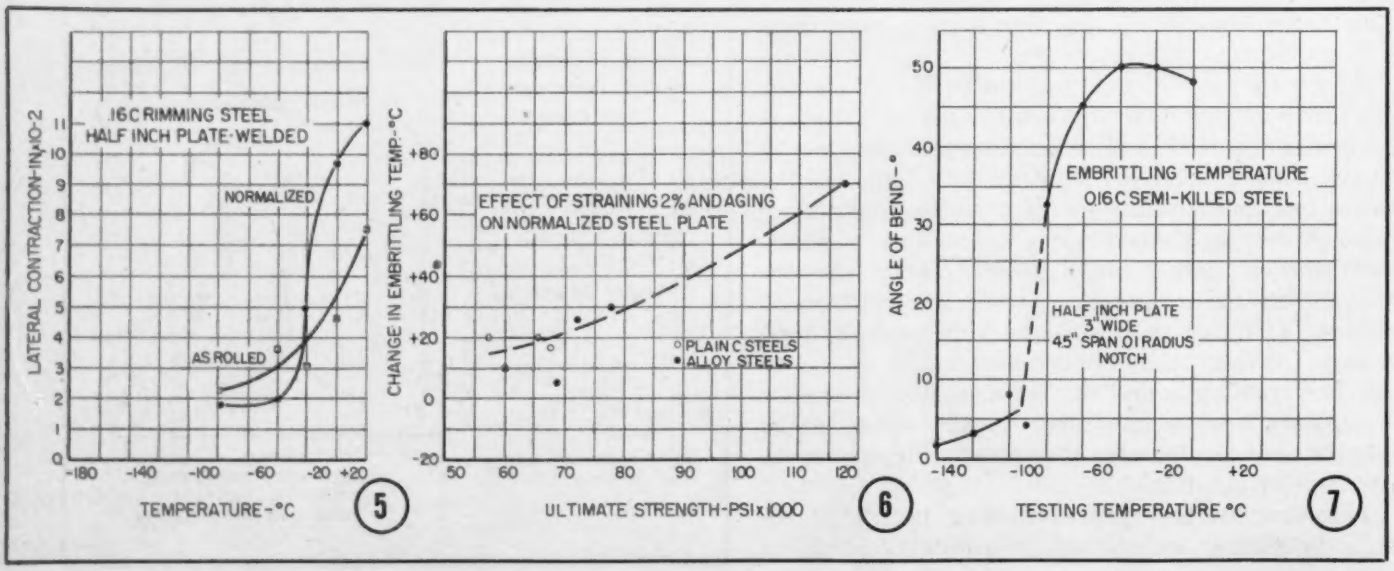
It has been well demonstrated that the embrittling temperature for steels which have been through-quenched and tempered is appreciably lower than for identical steels in the normalized or pearlitic state; also that straining raises the temperature at which brittle behavior is evident. This is not strange as total plastic deformation is limited and straining uses some of it. However, the effect of a given small amount of strain, say 2 per cent, is broadly of little consequence in those steels which are highly ductile, but is of major importance in the less ductile steels, such as those having high carbon. Aging after straining further increases the temperature at which brittle behavior results in some steels, but in others no such effect appears.

The trend is shown in Fig. 6. Normalizing prior to straining or strain aging generally lowered the temperature at which embrittlement occurred. This is understandable in that the as-rolled specimens probably comprise a certain degree of strain aging as received, which effect was eliminated by the normalizing. This difference between normalized strain-aged and as-rolled strain-aged specimens held for the welded specimens as well as for those tested without welding, in most instances. (*Please turn to Page* 108)

Fig. 5—Effect of normalizing on embrittling temperature—0.16 per cent carbon rimming steel, ½-inch plate, welded. Note: 0.03-inch lateral contraction equals 1 per cent

Fig. 6—Effect of straining 2 per cent and aging on embrittling temperature on normalized steel plate

Fig. 7—Embrittling temperature as a function of angle of bend, 0.16 per cent carbon semikilled steel



An Evaluation of

Boron-Treated Steels

Latest information on these steels will help the consumer appraise them from a practical standpoint. Investigations reported in the past 2 years furnish convincing proof that the domestically plentiful nonmetallic element, boron, when added to medium carbon steel in homeopathic doses, exercises powerful influence on certain physical properties of the steel. How the element is introduced, and what methods are available for accurately determining its presence, are important considerations in controlling boron's effectiveness

By WALTER F. TOERGE
Associate Editor, STEEL

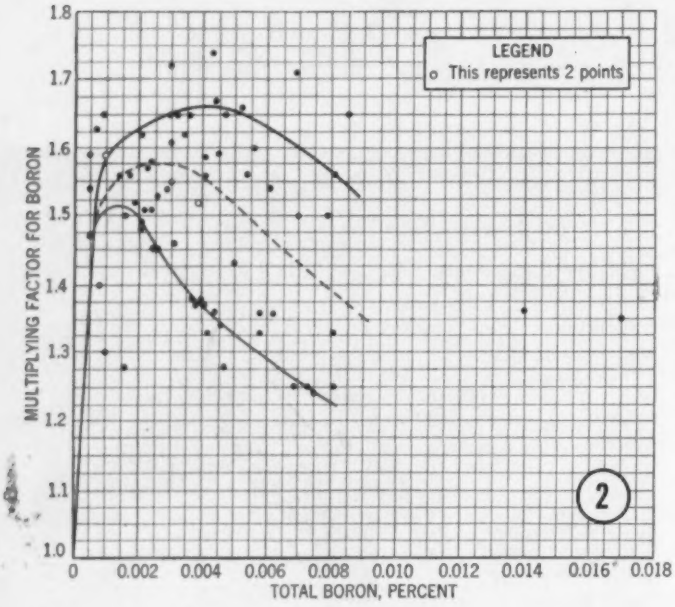
THAT the introduction of minute amounts of boron into steel is extremely effective in improving certain physical properties of the steel is now generally recognized and is being utilized to advantage. Recent investigations by private research organizations and government agencies reveal significant facts relative to commercial boron-bearing additives now available, methods of introducing the element, various means of determining the presence of boron in steels and the physical properties boron imparts to steel.

Of these properties, a substantial increase in hardenability, with an attendant increase in strength of all but very light sections, is by far the most important. As a matter of fact, it was the hardenability element that stimulated widespread interest in boron during the war. It was found that the element could be substituted for several hundred times its own weight of any other alloying element used for enhancing hardenability.

Bureau of Mines investigators[1] report that calculations on the basis of an average multiplying factor of 1.58 reveal that 0.003 per cent total boron in

A single ladle receives the entire output of a 180-ton tilting type open hearth furnace. In most steelmaking practices boron is added to the ladle during the tapping of the heat, after the regular deoxidizers have been added. Photo courtesy United States Steel Corp.

Boron-Treated Steels



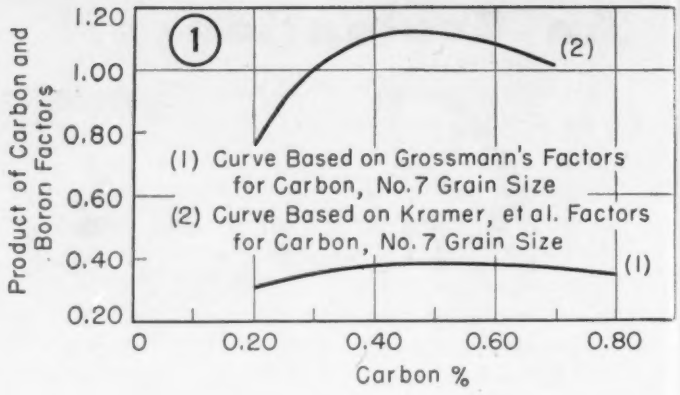


Fig. 1—Carbon content vs. combined effect of boron and carbon on hardenability. This illustration indicates that the greatest depth to a certain per cent of martensite would be achieved in boron steels at 0.40 to 0.60 per cent carbon with other alloying elements constant. From Rahrer and Armstrong[4]

Fig. 2—Effect of boron on hardenability of steel. This curve, from Corbett and Williams[1] agrees with the often-reported observation that a boron content in the region of 0.0025 per cent seems to exert the greatest influence on hardenability, and that hardenability decreases with further increase in boron

Fig. 3—Boron constituent in two steels, each containing 0.0025 per cent boron, both austenitized at 1625° F. This shows that boron constituent may form after ordinary austenitizing treatment when boron content is relatively high. X2000, picral etch. (Top) Coarse-grained, (bottom) fine-grained. From Grange and Garvey[5]

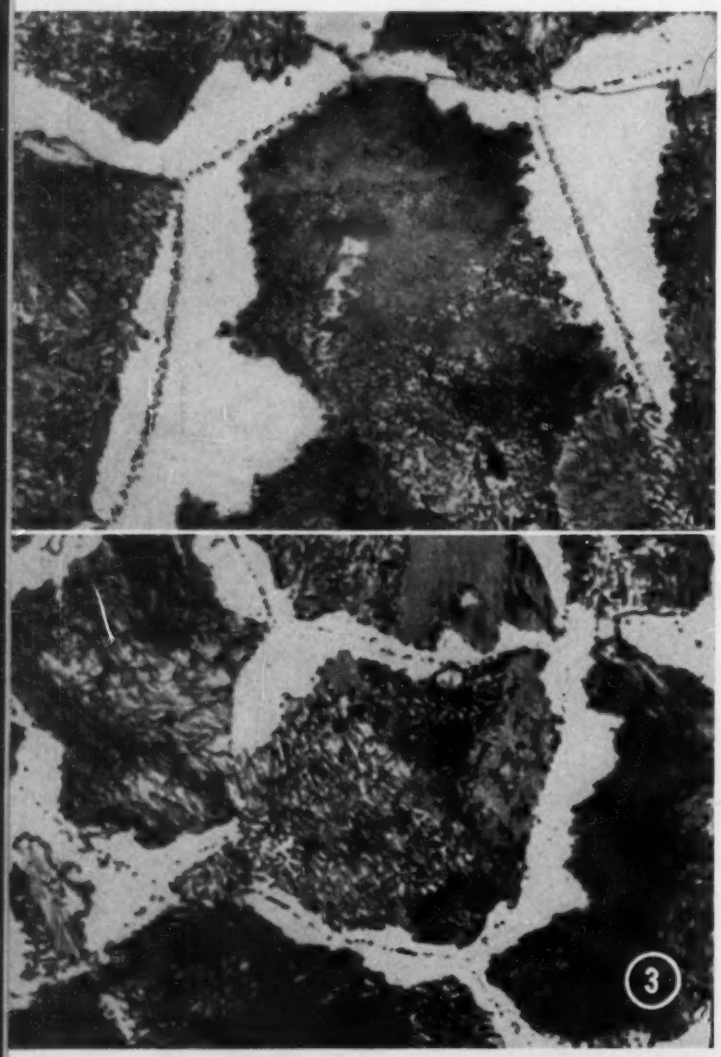
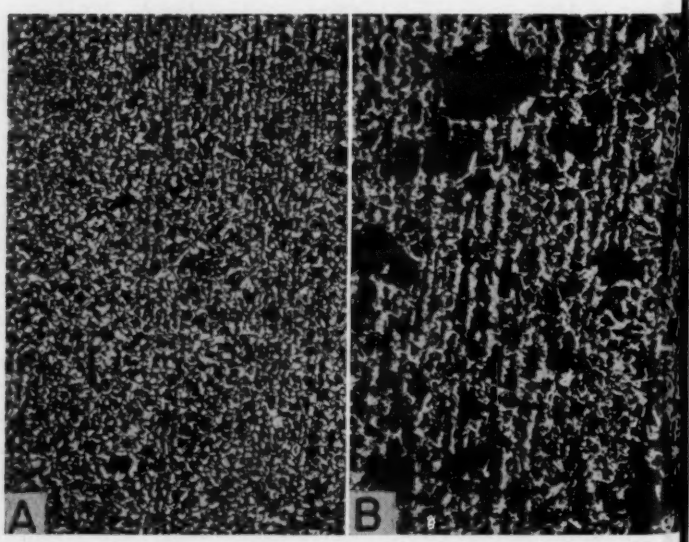


Fig. 4—Influence of boron on grain size at temperatures used in hardening experimental and commercial steels. Grain coarsening temperature (between 1650 and 1750° F) of experimental base steels (A, B, C) was usually lowered by the addition of about 0.0015 per cent boron with ferroboron (A and B); trend was for average size of grains at the hardening temperature to increase with further increase in boron content (B and C). Influence of boron on grain size of commercial steels at hardening temperature of 1550° F is illustrated in typical photomicrographs, D, E and F. See Tables I, II and III. From Digges and Reinhart[3]



steel has an effect on hardenability equal to the following content percentages of other elements: Silicon 0.87, nickel 0.79, chromium 0.27, manganese 0.12 or molybdenum 0.23.

Today boron is finding applications in a number of steels for bolts, shafting, gears and for many other commercial uses. In connection with the casting industry, tests at a midwestern university proved that boron definitely increases machinability of steel castings, whether they are in the as-cast, annealed or heat treated condition.

Hardenability Enhanced—In an Army Ordnance Dept. program, reported by Buswell, Danse and McGrath[2] of the Society of Automotive Engineers technical board, seven commercial addition agents were tested for effect in improving the properties of 0.45 carbon, 1.50 managanese steel for military purposes. The treated steel was practically equivalent in hardenability and mechanical properties to SAE 4145 except for lower notched toughness at relatively low hardness (rockwell C 40 or less), when tested at low temperatures.

Digges and Reinhart[3], examining quantitatively the effects of boron on properties of 250 experimental and 20 commercial steels for armor plate and other military uses concluded that hardenability of all of the commercial steels was markedly increased by boron, but no correlation was found between hardenability and the amount of boron added or retained in the steels. Magnitude of boron's hardenability effect, the authors found, evidently depends upon the form in which it exists in austenite; not necessarily upon the total amount present.

The influence of boron on hardenability and on notch toughness (Charpy impact), of fully hardened and tempered steels varied with the composition of the steels, intensifiers and amount of boron present. It was found that the increase in hardenability due to boron was greater for basic open-hearth than for experimental steels made in an induction furnace.

As determined by the end quench test the authors report hardenability of all the steels comprising a basic open-hearth heat was noticeably improved by the additions of boron. No definite correlation, however, was found between the hardenability effect and the amounts of boron added or retained in the steels. In general, relatively small additions of boron were more effective than large.

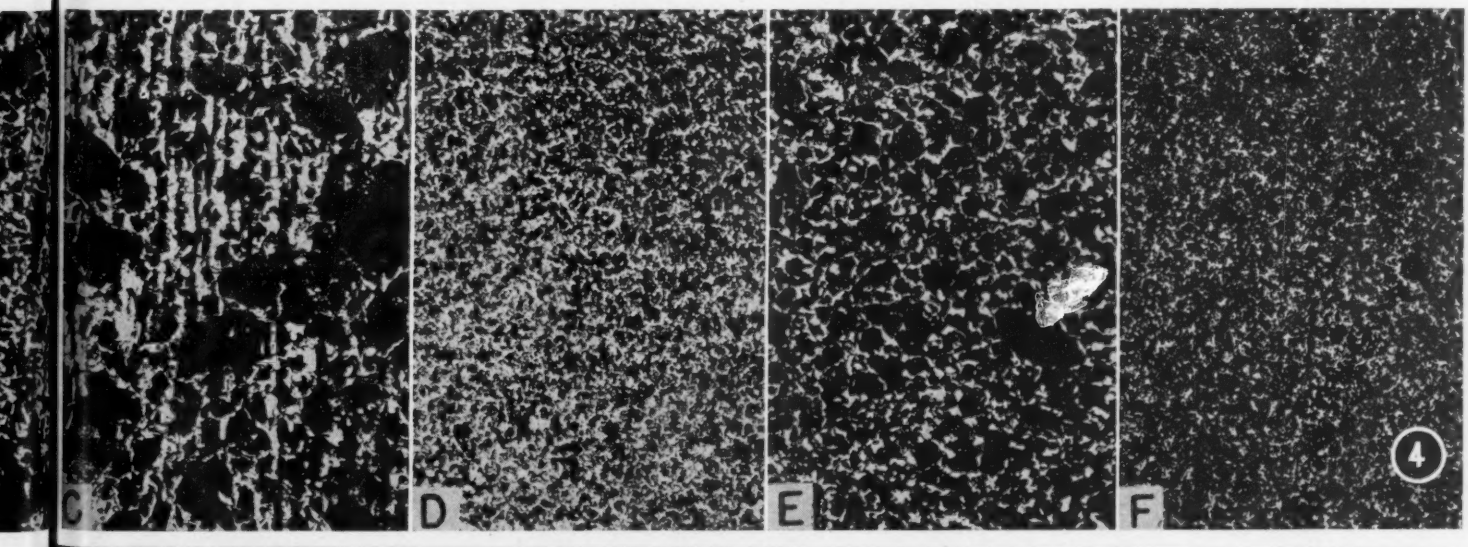
Effectiveness of boron in improving hardenability increased with the amounts (within limits) of manganese, chromium and molybdenum. State of deoxidation of the heat and final nitrogen content also influenced hardenability. High soluble nitrogen and possibly oxygen were detrimental to the boron effect on hardenability. It was possible, however, to retain the effect in high-nitrogen steels (low soluble nitrogen) by fixing the nitrogen with nitride-forming elements such as titanium or zirconium.

Hardenability of some of the experimental steels and commercial steels treated with boron was affected by variation in quenching temperatures. In certain steels, degree of hardenability was improved by raising the quenching temperature above the usual recommended range, whereas in other steels hardenability was not affected or was decreased.

Effect of Carbon Content—According to Rahrer and Armstrong,[4] their studies on the effect of carbon content on the hardenability of boron steels, indicate that with boron additions of 0.0006 to 0.0045 per cent, only carbon content and intensity of deoxidation affect the hardenability factor for boron to a marked degree. Steels tested included 53 plain carbon to medium alloy types, carbon 0.12 to 0.95.

Using the formula $F_B = 1 + 1.5\ (0.90 - C)$, in which F_B equals hardenability factor for boron and C equals carbon content in per cent, the combined effect of carbon and boron at various carbon contents was calculated by multiplying the boron factor by the factor for carbon assuming a grain size of 7. The authors found further that adequate deoxidation with aluminum or other strong deoxidizers prior to or accompanying the addition of boron is required to realize that potential increase in hardenability from boron.

Fig. 1, from Rahrer and Armstrong's paper, indicates that the greatest depth, to a certain per cent of martensite, would be reached in boron steels at 0.40 to 0.60 per cent carbon with the several other



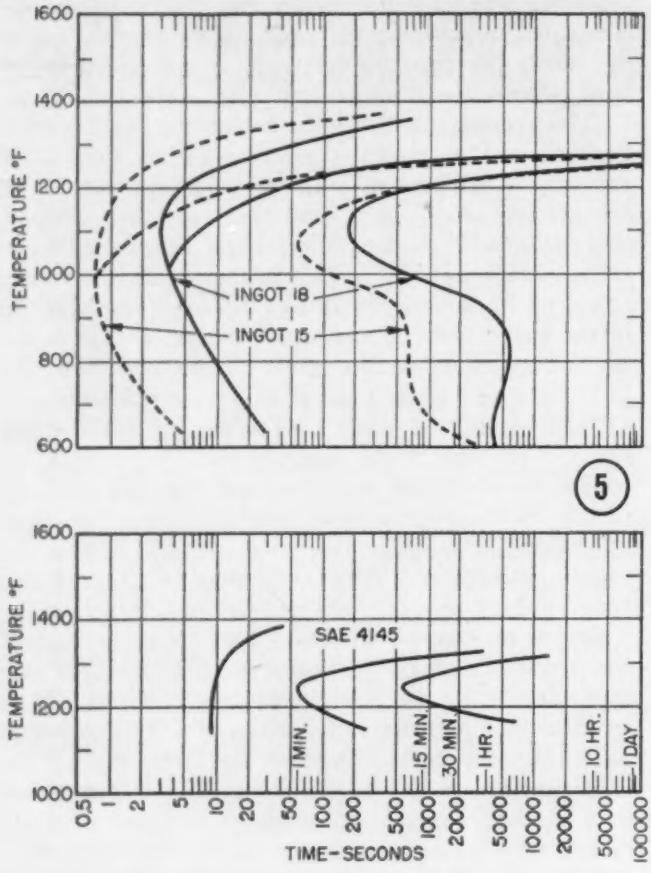


Fig. 5—Upper portions of isothermal transformation diagrams on untreated (ingot 15), treated (ingot 18) and SAE 4145 steels. Ingot 18 was treated with Bortam, 6 pounds per net ton. From SAE report[3]

Fig. 6—Influence of boron on transformation temperatures of experimental steels containing 0.3 per cent carbon, 0.8 or 1.6 per cent manganese and varying amounts of nickel and chromium. From Digges and Reinhart[3]

Fig. 7—Comparison of isothermal transformation curves 0.63 per cent carbon and 0.87 per cent manganese steel, with and without boron, both austenitized at 1500° F; grain size: 5-6. Courtesy United States Steel Research Laboratory

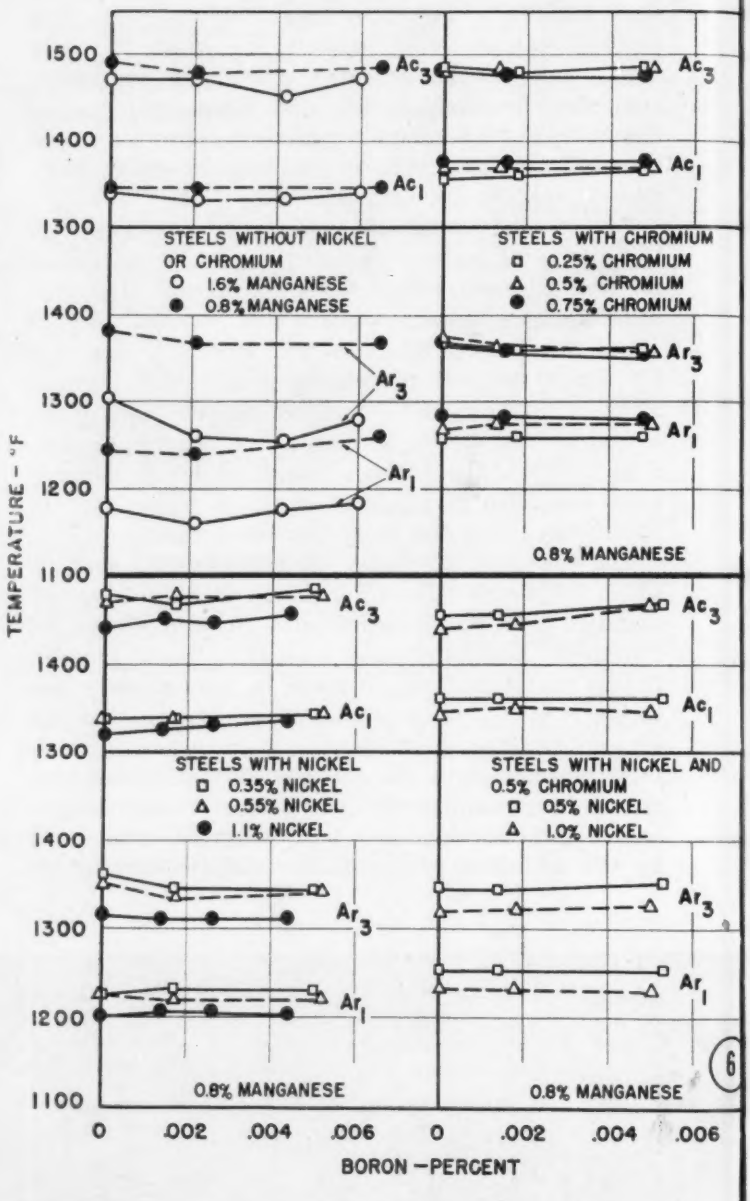


TABLE I

CHEMICAL COMPOSITION (PERCENTAGE BY WEIGHT) OF EXPERIMENTAL CARBON-MANGANESE STEELS.

Steel No.	C	Mn	P	S	Si	Al	N[2] Total	Boron[1] Added	Boron[1] Recovered
1	.29	1.60	.011	.020	.26	....	0.006	None	[3]
2	.28	1.60	....	....	.23	0.05	.005	0.0015	.0015
4	.27	1.61	....	....	.26	.05	.005	.006	.0060

[1] Two pounds of aluminum per ton (0.10 per cent) were added to each heat before making the boron additions with ferroboron as required in the furnace.
[2] Determinations were made by the vacuum-fusion method.
[3] When no boron was added, determinations of boron recovered usually were not made.
From Digges and Reinhart[3]

TABLE II

ETCHED WITH 1% NITAL, X 100; A, B, AND C, EXPERIMENTAL STEELS; D, E, AND F, COMMERCIAL STEELS.

Figure	Steel No.	Agent	Boron Amount %	Temperature °F	ASTM Grain No.
A.....	1.....	None	None	1,575	8.
B.....	2.....	Ferroboron	0.0015	1,575	7, few 4 to 6.
C.....	4.....	Ferroboron	.0060	1,575	3 to 7.
D.....	C15 ...	None	.0001	1,550	8.
E.....	C6	Silicaz No. 3	.0009	1,550	7, few 5.
F.....	C8	Silicaz No. 3	.0031	1,550	8.

From Digges and Reinhart[3]

TABLE III

CHEMICAL COMPOSITION (PERCENTAGE BY WEIGHT) OF COMMERCIAL STEELS.

Steel No.	C	Mn	P	S	Si	Ni	Cr	Mo	V	Ti	Zr	Cu	Nitrogen Al (total)	Nitrogen Acid soluble[1]	Nitrogen Total	Boron Recovered, as determined Chemically Added	Acid soluble	Acid insoluble	Total	Spectrographically	Ferroalloy
C6	0.44	1.58	0.017	0.019	0.40	0.01	0.05	0.01	Nil	0.019	0.004	0.02	0.040	0.003	0.003	0.0011	0.0009	0.0000	0.0009	0.0013	Silcas No. 3
C8	.43	1.58	.019	.019	.50	.01	.05	.01	Do.	.053	.010	.02	.058	.003	.003	.0022	.0031	.0000	.0031	.0042	Do.
C15	.43	1.58	.020	.019	.31	.01	.05	.01	Do.	.001	.002	.02	.025	.004	.004	None	.0000	<.0001	<.0001	.....	None

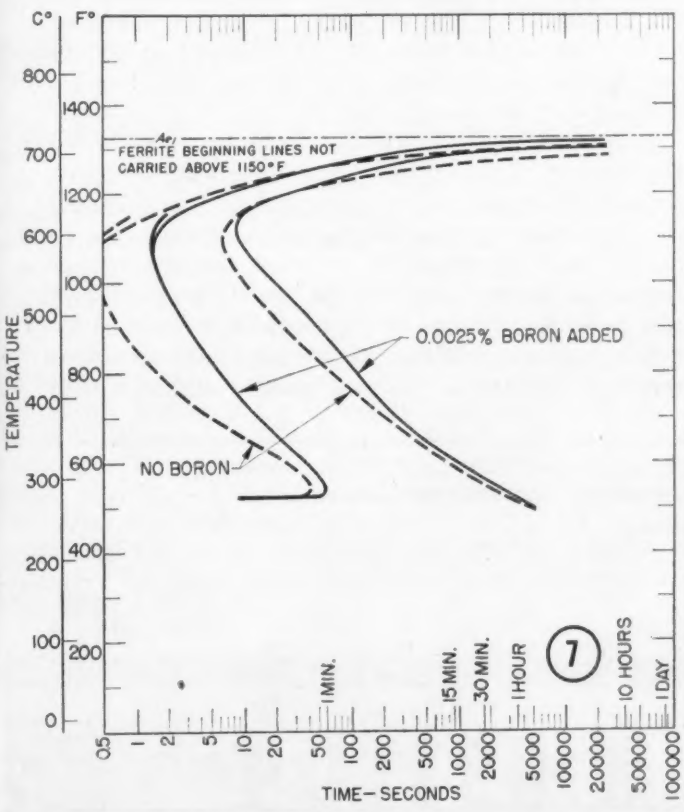
From Digges and Reinhart[3]

Boron-Treated Steels

alloying elements remaining constant.

Hardenability Factor—In understanding the significance of the term "hardenability factor" as used by Rahrer and Armstrong and by other investigators it is necessary to be familiar with the method developed by Mark A. Grossman of U. S. Steel Corp. Dr. Grossman's findings are published in the AIME journals. Corbett and Williams explain the system as follows: "From the grain size and chemical composition of a steel, its hardenability may be calculated with an accuracy of 10 to 15 per cent using Grossman's method. (This) is based upon the concept that a pure iron-carbon alloy has a certain hardenability, and that each additional element is represented by a multiplying factor by which the base hardenability is multiplied. Total hardenability of the steel (is) the product of all the factors, with a proper correction for grain size. Of far greater importance, however, is the fact that if the hardenability, grain size and multiplying factors for the various elements, with the exception of boron, are known, it is possible to calculate the multiplying factor due to boron alone and thus show the effect of boron upon the hardenability of the steel". Fig. 2, from the Corbett and Williams report shows the great influence of boron on hardenability.

In evaluating the factors affecting the hardenability of boron-treated steels, Grange and Garvey[5] selected four plain carbon commercial open hearth steels containing 0.40, 0.52, 0.63 and 0.75 per cent carbon. They pointed out that the effect of boron on hardenability is noticeable on all these steels



and is greater as carbon content decreased. Increase in hardenability produced by boron is greatest when the austenitizing temperature is 1550 to 1600° F. It gradually becomes less for higher austenitizing temperatures and may approach zero at about 2000° F. Improvement in hardenability is roughly parallel to, but does not correlate with the percentage of boron as determined by chemical analysis of the steel. As little as 0.001 per cent boron may be sufficient to develop the maximum increase producible by boron.

In a given steel, the authors state, increase of hardenability correlates fairly with the amount of a "boron constituent" which is microscopically visible as a row of fine dots, Fig. 3, at the austenite grain boundaries when the steel is carefully heat treated in a special way. This precipitate is not observed if the boron content is less than 0.0004 per cent. When the boron is about 0.001 per cent or higher, dots may appear as a band resembling eutectic or eutectoid aggregate.

Diminishing Effect—It was also noted that when a boron-treated steel is heated at a very high temperature for a very long time the increase of hardenability due to boron gradually diminshes and finally disappears. It cannot be restored by any subsequent heat treatment of such a "homogenized" steel. Under this treatment the characteristic boron constituent likewise disappears, although boron content as measured by analysis remains unchanged. It is possible, that some part of the efficiency of boron in enhancing hardenability may be lost when the steel is heated for rolling or forging.

Emphasizing the importance of hardenability study Corbett and Williams stated that neither the hardness nor any other property of a steel is materially improved by treatment with boron if the steel is normalized, annealed or given a high-temperature draw. Most important effect of the proper use of boron is to increase the hardenability of steel used in the quenched condition without tempering or with only slight tempering.

Grain Size—Results of Digges and Reinhart's research show that boron lowers the coarsening temperature of austenite. Steels with relatively high additions of boron however, can be made fine grained at heat-treating temperatures by the careful use of grain-growth inhibitors such as aluminum, titanium and zirconium. Grain coarsening temperature in the experimental steels studied was usually lowered by the addition of about 0.0015 per cent of boron with ferroboron; trend was for the average size of grains at the hardening temperature to increase with further increase in boron content. Fig. 4 shows influence of boron on grain size at temperatures used in hardening experimental and commercial steels. Chemical composition (percentage by weight) of experimental carbon-manganese steels is shown in Table I; commercial steels—Table III.

"All other things being equal", Grange and Garvey wrote, "a boron-treated steel has generally been found to have larger austenite grains than a comparably austenitized steel without boron". However, the authors said this phenomenon is of no

particular significance because the grain-coarsening effect of boron can be overcome by deoxidation with aluminum. It was found that addition of boron to 0.40 and 0.52 per cent carbon steel series lowered the temperature at which austenite grains coarsened in a given time. With a higher boron content the grain growth behavior developed like that of steel which is not aluminum-killed.

The SAE Technical Board findings also show that the tendency is for grain size to be increased by the addition of boron. This trend was partially counteracted by the effect of grain refining elements when these agents were added in sufficient amounts.

Isothermal Transformations—Isothermal transformation diagrams, constructed in connection with the SAE studies, revealed that in general the diagram was shifted to the right by the addition of boron. Upper portions of isothermal transformation diagrams on one boron-treated and on one untreated ingot and SAE 4145 steel are illustrated in Fig. 5.

Digges and Reinhart carried on tests to check the effect of boron additions made with ferroboron on the temperatures of the A_1 (Ac_1 and Ar_1) and A_3 (Ac_3 and Ar_3) transformations of certain experimental steels. Results, Fig. 6, for some of the steels, indicate that boron had no significant effect on the temperatures of A_1 and A_3 transformations. Variations in nitrogen from about 0.005 to 0.025 per cent in steels with and without boron also had no appreciable influence on the temperatures of the transformations on slow heating (Ac_1 and Ac_3); there was a slight tendency for the temperatures on slow cooling (Ar_1 and Ar_3) to increase with the nitrogen content. Temperature of Ac_3 also tended to be raised by the addition of titanium or aluminum.

Influence of boron on transformation temperatures of experimental steels containing 0.3 per cent carbon, 0.8 or 1.6 per cent manganese and varying amounts of nickel and chromium are shown in Fig. 6, from Digges and Reinhart. Fig. 7 compares isothermal transformation curves of 0.63 and 0.87 per cent manganese steel with, and without, boron.

Notch Toughness—Addition of small amounts of boron is often beneficial to the notch toughness at room temperature of the steels, fully hardened and tempered at low temperatures. Digges and Reinhart go on to say that when steels were fully hardened and tempered at high temperatures, boron, especially when present as relatively high additions with intensifiers containing titanium, was either without effect or was detrimental to notch toughness at room and subzero temperatures. Notch toughness of many of the steels fully hardened and tempered at 1000° F was not affected appreciably by a change in test temperature from room to −95° F.

According to Buswell, Danse and McGrath, in general notched toughness varied with boron content, composition of the addition agents and hardness of fully hardened and tempered steel. For the steels tempered at 800° F or higher, to relatively low hardness, impact properties were not improved by the addition of boron. When tempered at 400 to 600° F to high hardness, notched toughness was increased by the boron.

Tensile Properties—Tensile tests were made by Digges and Reinhart on normalized and on heat-treated specimens of experimental and commercial steels. Commenting on characteristic trends due to boron, these investigators reported "no marked or consistent improvement in the tensile properties of the steels as annealed or as normalized could be attributed to the addition of boron. However, an interesting feature of the test results obtained with

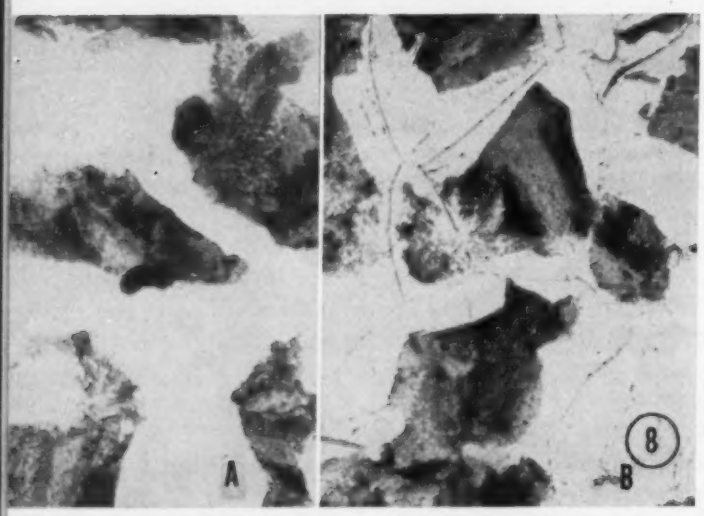
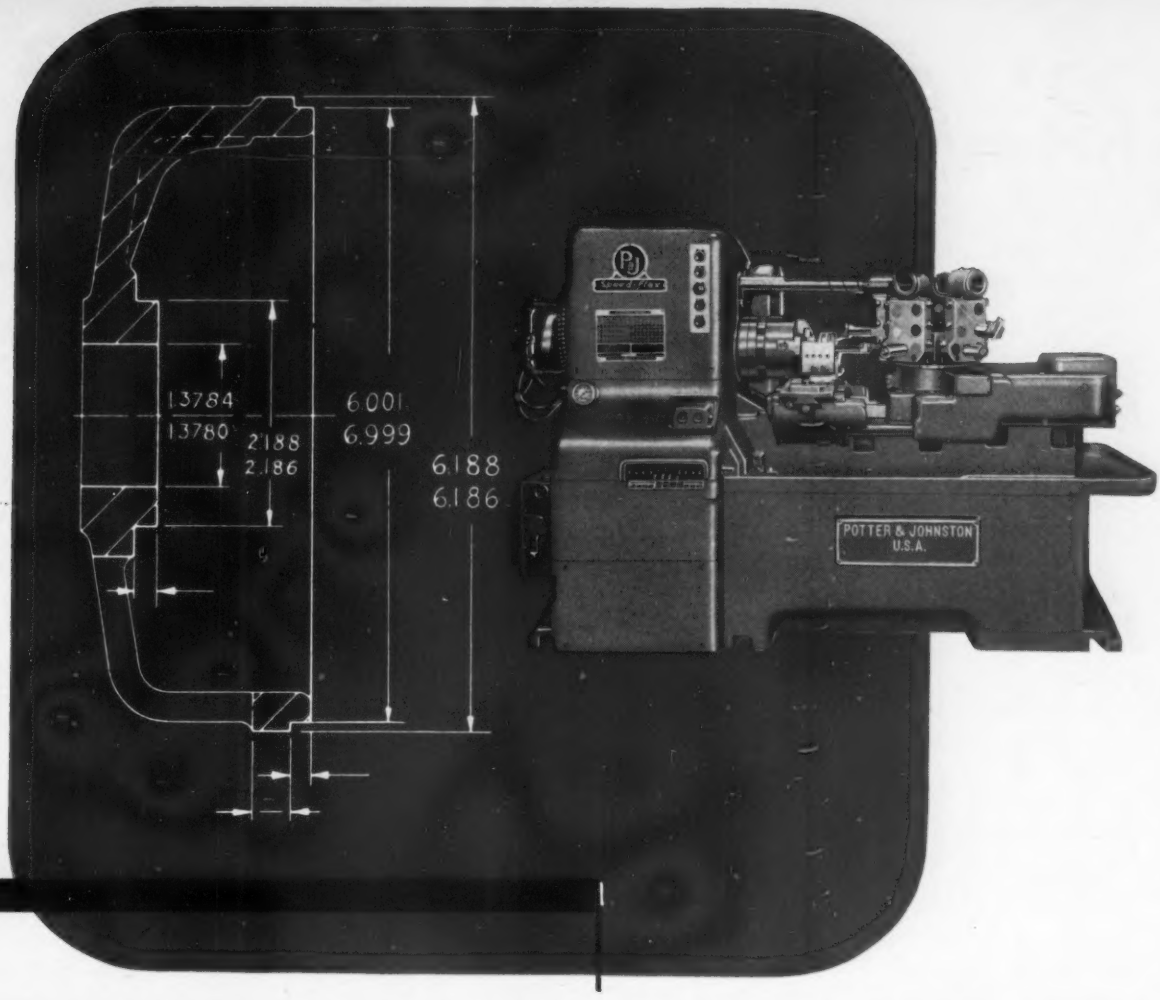


Fig. 8—Metallographic test for boron in 0.25 per cent carbon low alloy steel. X500, picral etch. Austenitized at 2000° F, quenched in lead at 1200° F and held for 4 hours and then quenched in water. (A) No boron, (B) 0.0025 per cent boron. From Grange and Garvey[5]

TABLE IV
COMPOSITION OF COMMERCIAL BORON-CONTAINING AGENTS USED FOR STEEL ADDITIONS.

Agents	Composition, per cent									
	B	Ti	V	Zr	Al	Si	Mn	C	Fe	Other
Silcaz 3 alloy	0.55–0.75	9–11		3–5	6–8	35–40				Ca 9–11
Bortam	1.5–1.9	16–18			13–15	20–22	21–24	<1	bal.	
Carbortam	0.90–1.15	15–17			1–2	2.5–3.0	0.1–0.2	6.5–7.5	69–70	Cr 0.10–0.20 SO .025–0.035 PO .0025–0.0035
Borosil	3–4					35–40			bal.	
Grainal No. 79	0.5	20		4	13		8		bal.	
Vanadium Grainal No. 1	0.2	15	25		10				bal.	
Vanadium Grainal No. 6	0.2	20	13		12				bal.	
Ferro-boron (Molybdenum Corp. of America)	10–14					4		<3	bal.	
Ferro-boron (Electro Metallurgical Co.)	>17.50				<0.5	<1.5		<0.5	bal.	



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ACTUAL CUTTING TIME . . . . . only 93.6 "

Which adds up to 2 minutes 3.6 seconds "Floor-to-Floor" time per piece, or 24.77 pieces in a "51 minute hour!"

Now picture your work on this machine! Same size and type of Automatic which day in and day out is giving this splendid performance on 6.187 inch diameter cast iron motor end shields, will do equally profitable work for you on a wide variety of parts.

Bear in mind that Potter & Johnston's new 3-U Speed-Flex weighs only 5000 pounds and occupies only 16 square feet of your valuable floor space. Bear in mind that its standard range of spindle speeds, from 73 to 1445 revolutions per minute (with 36 to 711 optional) gives full scope both to high speed steel and carbide cutting tools, both on ferrous and nonferrous materials. Bear in mind that duration of non-productive phases in the automatic cycle have been reduced to lowest terms by electro-pneumatic control and split-second timing. Bear in mind that operating convenience of P & J 3-U machines attracts and holds services of the best operators.

Experienced P & J tool engineers will tell you the economic and production facts in terms of your own tough jobs—if you will send blueprints, or sample parts, with specified limits.

POTTER & JOHNSTON
MACHINE CO., PAWTUCKET, R. I.

greater yield and tensile strengths and reduction of area of each steel as normalized (cooled in air) as compared with the same steel as annealed (cooled slowly in furnace.)"

On quenched and tempered oversize 0.505-inch tensile specimens, the SAE report points out, values for yield strength, ultimate strength and hardness were not materially affected by additions of boron with any of the intensifiers used when tempered alike at 450, 600, 800, 1000 and 1200° F. The treated steels, when tempered at 450 or 600° F, gave superior combinations of ultimate strength and reduction of area (expressed in terms of "P-value") over those of the untreated ingot in all cases.

$$\text{"P-value"} = \frac{T + 6R}{5},$$ where T = ultimate strength in thousands of pounds per square inch and R = reduction of area in per cent. P-values were not, in general, improved by boron at temperatures of 800° F or higher.

Adding Boron—Special alloy addition agents both simple and complex, represent the most outstanding use of boron in iron and steel. Addition of these agents, or intensifiers, usually supplements the customary steelmaking processes. Depending upon the nature of the process and the particular conditions of operations, the alloy selected is usually added in the ladle or under some conditions may be added in the furnace or even in the ingot molds.

The latter practice has been effectively accomplished without the occurrence of irregularities or other detrimental results. It is only necessary that the alloy be crushed to the proper size and added in a manner which will insure complete solution and uniform distribution. This permits the use of single heats of steel in providing products to meet different physical property specifications. However, it is generally agreed that application of the practice of mold additions places considerable dependence on the human factor which cannot be overlooked wherever uniformity is involved.

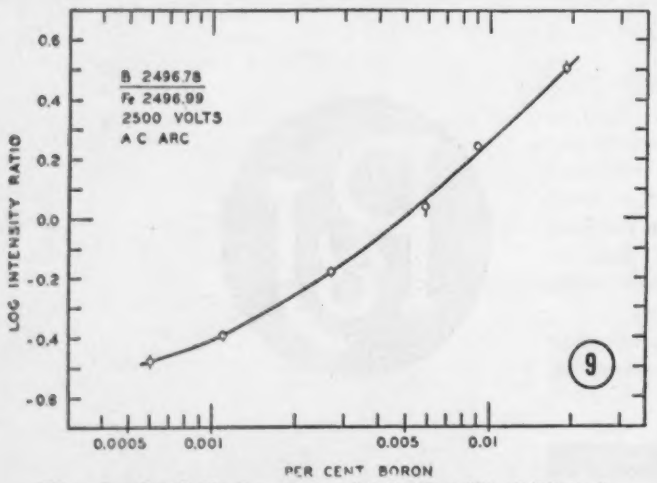

Fig. 9—Analytical curve obtained with 7/32-inch diameter National Bureau of Standards spectrographic boron steel standard sample rods and the alternating current arc

Norman F. Tisdale, of Molybdenum Corp. of America, in his discussion of Grange and Garvey's paper, stated" . . . One can easily assume boron steels are made by dumping a boron alloy in the ladle. . . . It should be particularly drawn to the attention of the reader that the benefits possible to obtain consistently from the use of boron can only be obtained by the use of the best alloy practices."

In most steelmaking practices the alloy is added to the ladle during the tapping of the heat, after the regular deoxidizers have been added. Mold additions, however, have been made for experimental purposes, when it was desired to make the addition to only part of the heat. Additions to the furnace have been made in a few special instances, for example, where the presence of slag in the ladle prevented proper mixing of the additive and the steel. It has been found that the optimum quantity of an intensifier to add to a given steel depends on the composition and steelmaking practice of the particular steel to which it is to be added.

Murray C. Udy[6] of Battelle Memorial Institute, Columbus, observes that "fading of the boron effect in the last ingots of a pour has been reported but this is probably a result of poor steelmaking practice, and will not occur when the boron addition is sufficiently protected with aluminum.

A general summary of the American Iron and Steel Institute report on special addition agents[7] recommends that in general, such agents should be added to the ladle; occasionally they may be put into the mold.

Agents—Of the various addition agents available for adding boron to steel, Silcaz and ferroboron are made by Electro Metallurgical Co., a unit of Union Carbide and Carbon Corp., New York. This company also makes manganese-boron, but this is seldom, if ever, used for adding boron to steel. Molybdenum Corp. of America, Pittsburgh, produces ferroboron. Ohio Ferro Alloys Corp., Canton, O., makes Borosil. Bortam and Carbortam are products of Titanium Alloy Mfg. Co., Niagara Falls, N. Y. Vanadium Corp. of America, New York, makes a series of three grainal alloys designated as Vanadium Grainal No. 1, No. 6, and Grainal No. 79. Composition of these commercial boron-bearing agents for steel additions are given in Table IV.

TABLE V

PRECISION OF 2500-VOLT A-C ARC METHOD SEVENTEEN RUNS OF NBS STD. SAMPLE 427 ON ONE PLATE

Boron content PERCENT	Deviation PERCENT	Boron content PERCENT	Deviation PERCENT
0.00282	0.00012	0.00262	0.00008
.00256	.00014	.00288	.00018
.00271	.00001	.00286	.00016
.00261	.00009	.00269	.00001
.00270	.00000	.00266	.00004
.00281	.00011	.00253	.00017
.00277	.00007	.00258	.00012
.00278	.00008	.00262	.00008
.00275	.00005	[1]0.00270	[1]0.00009

Average deviation from the mean = 4%

[1] Average
From Corliss and Scribner[9]

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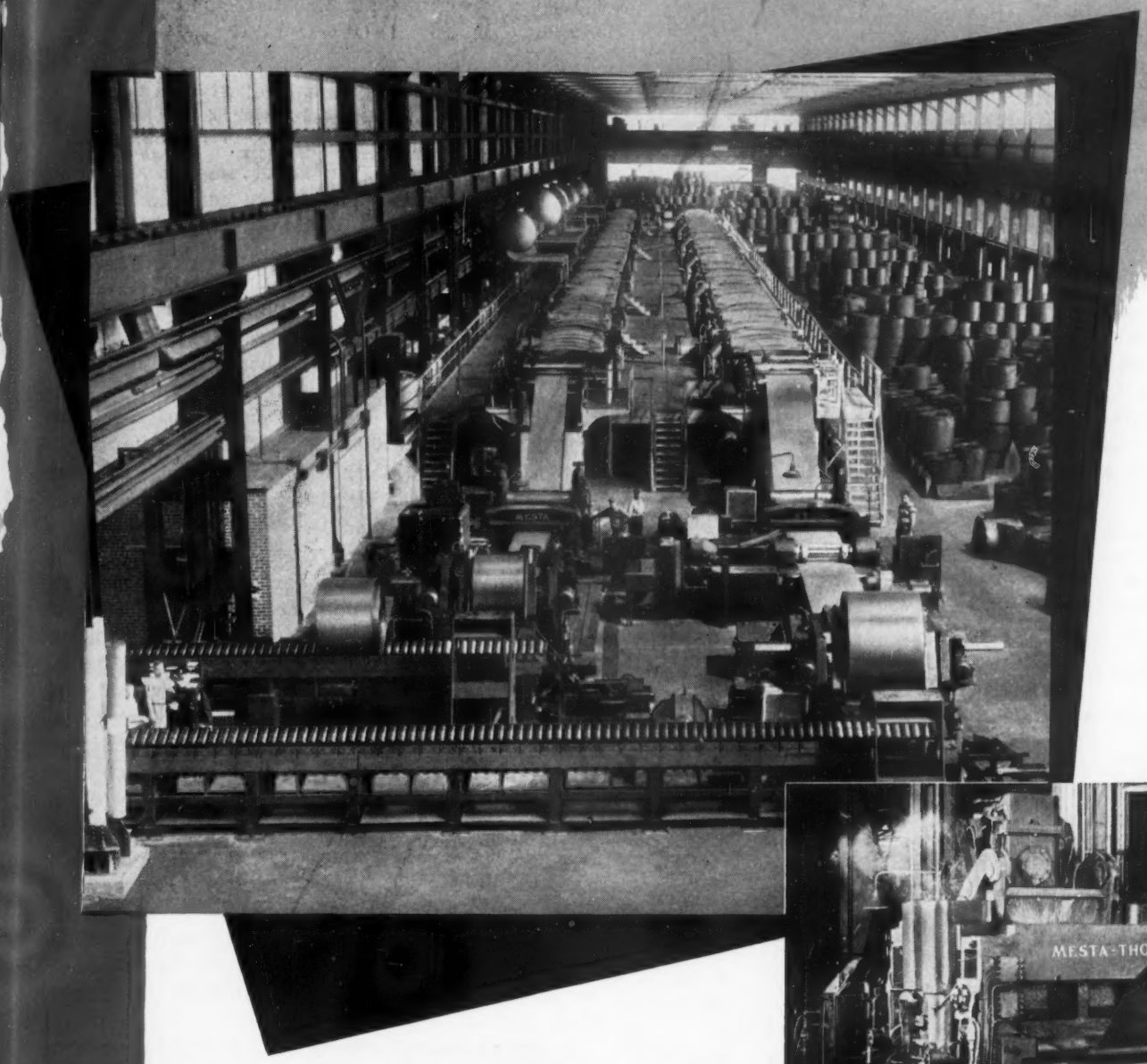
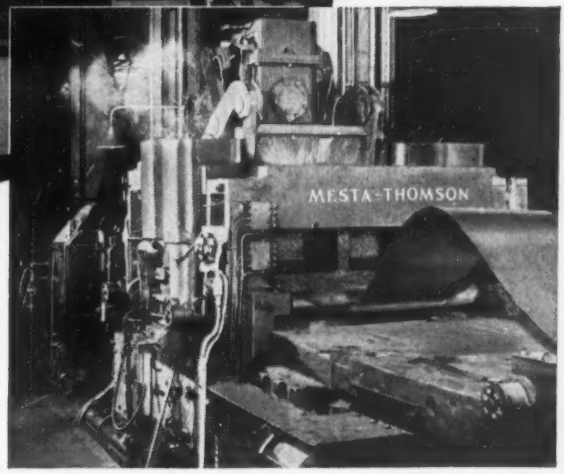
built by MESTA





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Boron-Treated Steels

Dean and Silkes[8] divided the boron containing addition agents into three groups: 1. Borax or other boron compounds; 2. ferroboron, aluminum-boron, manganese-boron or other metallic combinations; 3. special addition agents or hardenability intensifiers. Results in the first group, according to the authors, cannot be readily controlled.

In reviewing the various additives, Corbett and Williams identified the alloys Silcaz, Bortam, Carbortam, Grainal No. 79, Grainal No. 1 and Grainal No. 6 as "special deoxidizers' or "special addition agents" as they consist of various combinations of such elements as aluminum, boron, calcium, manganese, silicon, titanium, zirconium and vanadium. The other boron alloys are principally binary combinations of boron with some other elements.

Additional elements in the special agents serve to protect the boron from excessive oxidation upon their addition to molten steel, and they have been found to have beneficial effects of their own on the properties of the steel to which they are added.

Analysis Methods—Presence of boron in steel can now be measured quantitatively with reasonable accuracy throughout the range of usual addition to steels by chemical, metallographic and spectrographic methods. The metallographic test for the presence of boron, developed by R. A. Grange of U. S. Steel Corp. is considered to be a useful one where the history of a steel is not known. Spectrographic analysis for boron is generally considered to be quite satisfactory if proper equipment is used.

Fig. 10—Quartz or Corning 728 apparatus for the colorimetric determination of small amounts of boron in iron and steel. Courtesy National Bureau of Standards

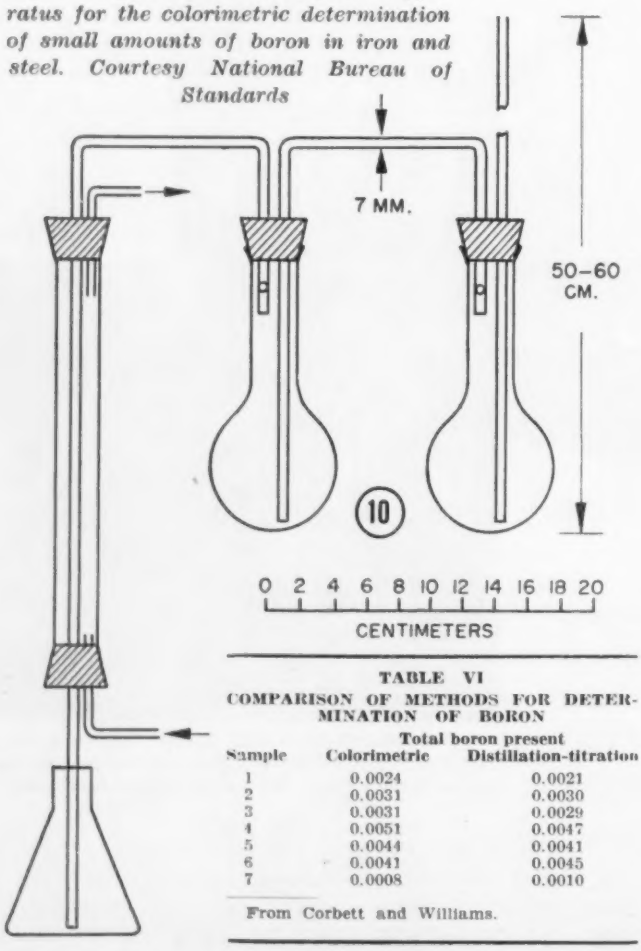


TABLE VI
COMPARISON OF METHODS FOR DETERMINATION OF BORON

Sample	Total boron present: Colorimetric	Distillation-titration
1	0.0024	0.0021
2	0.0031	0.0030
3	0.0031	0.0029
4	0.0051	0.0047
5	0.0044	0.0041
6	0.0041	0.0045
7	0.0008	0.0010

From Corbett and Williams.

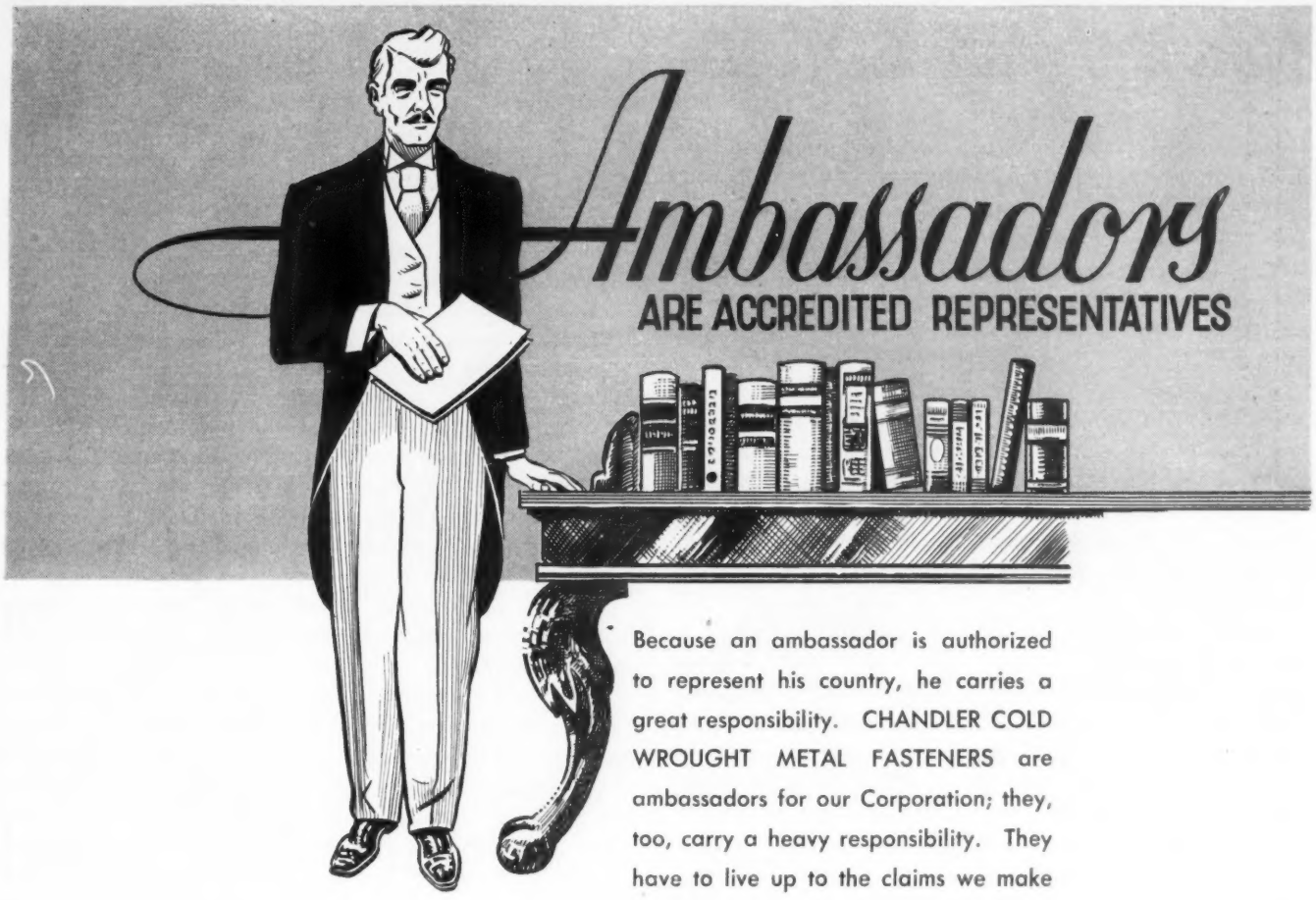
The chemistry division of the National Bureau of Standards is engaged in research into the chemical determination of boron in steels. A standard sample, No. 151, containing 0.0027 per cent boron is available. For spectrographic analysis, the NBS standards are generally adopted by industry. These samples cover the range 0.0006 to 0.019 per cent boron. Records of the Bureau show purchases of a total of 1196 spectrographic boron steel standards by 152 individual industrial laboratories.

Metallographic Test—The following description of Grange's metallographic test is abstracted from the Grange and Garvey paper. About 4 years ago it was discovered that after a special heat treatment the presence of even the small amount of boron added to increase hardenability in commercial practice resulted in the formation of a characteristic consitituent which could be readily observed in the microstructure. Subsequently, this "metallographic test" for boron has been applied to many boron-treated steels, all of which were found to contain this constituent whenever the boron treatment was successful in appreciably increasing the hardenability; on the other hand, no such constituent has ever been observed in a boron-free steel.

Steps involved in the metallographic test for boron are relatively simple, but must be carefully performed. A small sample of steel is heated at a temperature well above that ordinarily used in normalizing, annealing or hardening; for best results, grain coarsening must occur; a temperature of about 2000° F is usually necessary. After heating, sample is cooled rapidly to a temperature below A_1 Subsequent heat treatment must be such that sufficient time is allowed in the temperature range A_1 to 500° F for the boron constituent to precipitate from austenite and yet one which will produce a light-etching matrix in which the dot-like boron constituent will be microsopically visible after etching.

The heat-treated sample is then ground and prepared in the usual way for microscopic examination. Reasonably good polishing technique is required since the boron constituent is very small in volume and consists of tiny particles, Fig. 8. The structure should be examined at a magnification of at least 500X.

Spectrographic Determination—Discussing spectrographic determination of boron in steel, Corliss and Scribner[9] of the National Bureau of Standards, found that concentrations of boron commonly encountered in steels produced in this country are near the limit of spectrographic detection by the usual methods of excitation. As spark excitation is useful only for amounts of boron above 0.005 per cent. arc excitation is employed under conditions adjusted to obtain maximum sensitivity. In order to extend the range of determination to 0.001 per cent of boron or less, the limiting factors of interference by spectral background and by neighboring iron lines must



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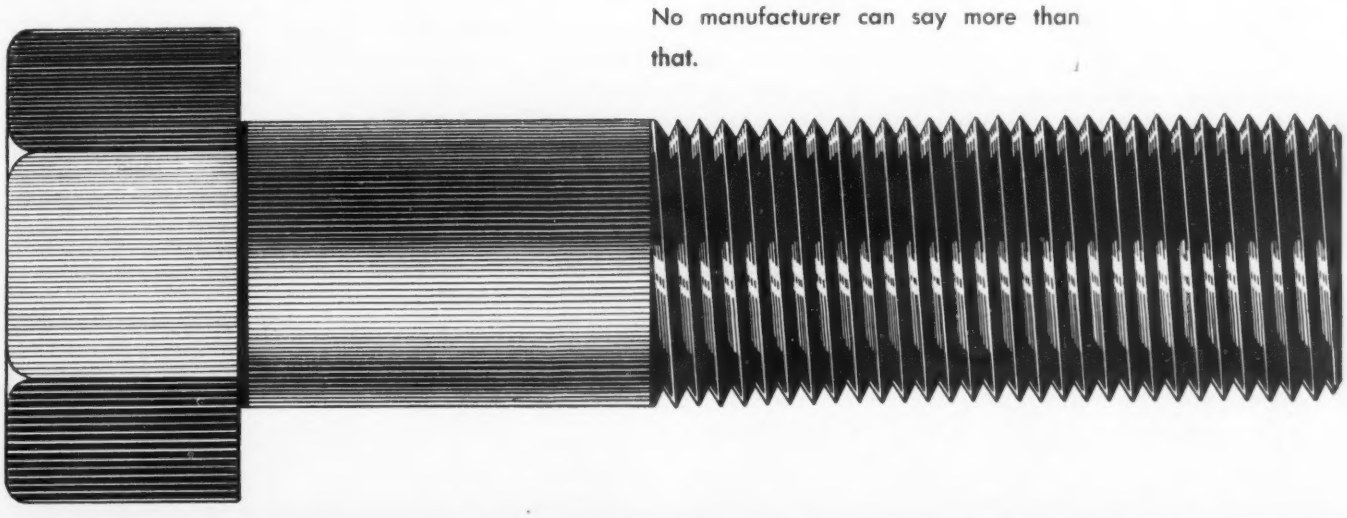

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be minimized. The unfortunate interference of the iron line Fe ii 2497.82 A with the strongest boron line B 1 2497.73 A makes the latter line unsuitable for analytical purposes.

The analytical curve shown in Fig. 9 was constructed by Corliss and Scribner from the mean values of four determinations on each of the six National Bureau of Standards boron-steel standard samples Nos. 425 to 430 inclusive. The spread of runs for each standard is indicated by length of the vertical line at each point; the mean set of values is given by the small circle. Determinations usually fall below this concentration in routine analysis. The accuracy of the method is demonstrated in Table V by the results of repeated runs on the same sample.

Masi[10] described a spectrographic method for determining boron in steel. The steel, with carbon 0.63, manganese 1.11, phosphorus 0.027, sulphur 0.032 per cent and with a known amount of B_2O_3 added was dissolved in 1:1 Hcl and graphite electrodes impregnated with the solution. With a spark source and a Zeiss Qu 24 quartz spectrograph, boron was determined over the range 0.03-2.01 per cent; for the lowest concentrations the sensitivity was very small, but above 0.2 per cent the accuracy was plus or minus 5 per cent.

Dean and Silkes point out that this method of analysis makes no distinction between soluble and insoluble boron compounds, while the chemical methods separate and analyze those distinctly.

Chemical Analysis—Of the several chemical methods of analysis, the Youngstown Sheet and Tube colorimetric method using quinalizarin is said to be most accurate. In general, results obtained by the colorimetric method are comparable in accuracy to those obtained by the distillation-titration method. According to Corbett and Williams, a careful analyst can detect 0.0002 per cent boron in either the soluble or insoluble portion of the steel, giving a precision of 0.0004 per cent for the total boron of the sample. The method is simple. An experienced chemist can determine the percentage of boron in 15 to 20 samples in 8 hours. Ordinary glassware is used. Accuracy of the method is further illustrated by Table VI which gives results of analyses on a group of samples that had been analyzed by the distillation-titration methods.

At Battelle Memorial Institute's analytical laboratory, Udy reports, the Youngstown Sheet and Tube method is used for boron percentages of less than 0.01 per cent. The Hague and Bright distillation and titration method is used for amounts greater than 0.01 per cent with estimated accuracies of plus or minus 0.002 per cent. Udy recommends the use of quartzware for both methods to prevent boron pickup from ordinary glassware. Quartz or Corning 728 apparatus for the colorimetric determination of small amounts of boron in iron and steel is shown in Fig. 10.

These and other methods are reviewed rather completely by Dean and Silkes. Some of the other analytical procedures are: (a) Distillation of methyl borate and titration; (b) precipitation with calcium carbonate and titration; (c) electrolysis with a mercury cathode and titration; (d) weighing as boron phosphate; (e) electrolysis over a mercury cathode and calcium carbonate separations; (f) method based on calcium carbonate separation.

Distillation-titration—The Hague and Bright distillation-titration method mentioned above is described as a means for determining small amounts of boron in steels and iron. According to Dean and Silkes, reporting on a Molybdenum Corp. of America and University of Pittsburgh symposium, this method can be used successfully in determining quantities varying from 0.0001 to 0.005 per cent of boron. Under general continuous laboratory practice, steels with small quantities of boron can be analyzed to plus or minus 0.0003 per cent boron. Chief disadvantage of this method is the long procedure required.

In the colorimetric, using quinalizarin, Dean and Silkes found that beryllium and magnesium interfere with this determination, as quinalizarin reacts with these elements. The determination can be made only in concentrated sulphuric acid; other acids produce no color with quinalizarin. This test is rapid and simple. The color change is so sharp that the presence of 0.001 per cent boron can be noticed easily.

When the colorimetric method is used with curcumin, the other elements such as iron, manganese, chromium, etc. must be removed by sodium hydroxide. This is necessary because they mask the color of red boron compounds. Sulphates destroy the red color when evaporated to dryness.

Considering the problem of analysis generally, Dean and Silkes pointed out that in any method, solutions containing free boric acid should never be boiled in open vessels; the acid is very volatile with steam. "Loss of boron as the trifuloride or the introduction of boron into the solution by the attack of borosilicate glassware (pyrex) by alkalies should be guarded against in analyses of the highest accuracy."

REFERENCES

1. R. B. Corbett and A. J. Williams, "Effects of Boron in Steel", Report of Investigations R. I. 3816, United States Bureau of Mines, June, 1945.
2. Society of Automotive Engineers Technical Board report on Investigation of Boron-Treated Steel—Ordnance Project Army Research and Development No. R. A. D. 1448, Aug. 2, 1946. Compiled by D. P. Buswell, L. A. Danse, H. T. McGrath.
3. Thomas G. Digges and Fred M. Reinhart, "Influence of Boron on Some Properties of Experimental and Commercial Steels" Research Paper RP 1815, National Bureau of Standards *Journal of Research*, Vol. 39, No. 1, p. 67, July, 1947.
4. G. D. Rahrer and C. D. Armstrong, "The Effect of Carbon Content on the Hardenability of Boron Steels", Transactions of American Society for Metals, Vol. 40, 1948. Paper presented October, 1947.
5. R. A. Grange and T. M. Garvey, "Factors Affecting the Hardenability of Boron-Treated Steels", Transactions of American Society for Metals, Vol. 37, 1946. Paper presented Feb., 1946.
6. Murray C. Udy, "Boron in Steel", *Metal Progress*, Aug., 1947, p. 257.
7. Work cited in reference 8.
8. R. S. Dean and B. Silkes, "Boron in Iron and Steel", Information Circular I. C. 7363, United States Bureau of Mines, Sept., 1946.
9. Charles H. Corliss and Bourdon F. Scribner, "Spectrographic Determination of Boron in Steel", National Bureau of Standards research paper RP1705. Part of *Journal of Research*, Vol. 36, April, 1946.
10. Work cited in reference 8.

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Creep Rupture Testing— *Continued from Page 90*

dent that sensitive and accurate measuring apparatus is necessary.

Essential feature of the measuring microscope is a relay lens with a 70 millimeter working distance sufficient to pick up the image of the reference marks near the center of the furnace and present it to an objective of necessarily short focal length. An added margin must be included in the working distance to avoid excessive heating of the lens. The relay lens magnifies the object two diameters and projects the image so that it can be picked up by the objective of a conventional microscope.

Total magnification of the optical system in 100X; its numerical aperture is 0.25. The 2X relay lens is used with a 32 millimeter objective resulting in a larger field than that obtained with 1X relay lens and a 16 millimeter objective. The filar-micrometer eye piece has a magnification of 10X. The vertical illuminator consists of a concentrated filament lamp, a condenser system, and a plane glass reflector mounted in the optical tube. Optical tube is fixed in a mount incorporating an elevating mechanism and focusing screw.

Microscope Support Unnecessary

Creep-rupture stand is identical with the creep stand except that the microscope support is not needed, and the thrust bearing for supporting the lever is removed to allow for greater lever movement as required by the sometimes considerably greater extension of the specimen. At this position in the frame, a trough is formed and a hydraulic jack at the base of the trough is used to support the lever arm when the specimen is not under load, to insure gentle application of the load, and finally as an effective shock absorber when the test specimen ruptures.

A bracket, suspended from the two sides of the front of the frame, is added to catch the furnace when the specimen breaks. Fall of the lever at rupture throws a knife switch to cut out the heating-current to the furnace; this serves the dual role of shutting off the furnace and of causing the time at rupture to be recorded on the temperature recorder.

The creep-rupture specimen is heat treated as a blank 3½-inches long, a 1/2-inch coupon being taken for examination, and the remainder machined to the 1/4-inch diameter specimen. Shallow gage marks are placed at the ends of the central 1-inch section in order to measure extension after rupture. Because this specimen has the same ratio of gage length to diameter its elongation is comparable to that of the ordinary 2-inch gage, 1/2-inch diameter tension specimen. Reduced specimen size in contrast to the 1/2-inch diameter creep specimen is needed to develop stress sufficiently high to cause rupture in this apparatus. Slight taper to the gage section insures that the specimen fractures near the center. The specimen is mounted in adaptors which are in turn attached to the same pull rods used in the creep test.

Same Equipment Used

In the creep-rupture tests the furnace window is not needed; yet it was convenient to use the same furnace, and for the most part the same electrical equipment, as in the creep test. In this, as in the creep test, the specimen is brought to test temperature and maintained there for about 20 hours before stress is applied. This is done by lowering the lever by means of a hydraulic jack.

It is very desirable to measure the extension occurring during a creep-rupture test even though the elapsed time to rupture is the primary concern. The extension is of much greater magnitude than in the creep test, and therefore the great sensitivity of the creep microscope is not needed. In fact, we have found it quite suitable to use the fall of the lever as a means of measuring extension. By running a fine metal chain (a string changes in length when atmospheric humidity changes) from the lever to draw a pen along a drum rotating at constant speed, an autographic elongation-time curve of sufficient sensitivity and accuracy is obtained.

When setting out to determine the creep strength of a "new" material, it is desirable to run what is known as an up-step or down-step survey in order to estimate the approximate stress corresponding to the specified creep rate. As the name implies, a specimen is stressed at several successive stresses in up-step or down-step fashion, the stress being maintained at any level for the minimum time (approximately 500 hours) needed to estimate the average rate of extension produced by that stress. Such preliminary results are not to be trusted as anything more than an approximation to the constant-stress creep-rate, inasmuch as the tests are of short duration, and, with the exception of the initial step are on material which has been plastically extended and is, therefore, generally different from the unstrained material.

Determining Creep Rate

Creep-rate is derived graphically from the elongation-time curve with the aid of a straightedge at 500 hour intervals as an average over 500 hours; i.e., the creep-rate at 2000 hours is taken as the average from 1750 to 2250 hours. The minimum rate, or that of stage 2, is plotted against the stress to permit determination of the stress for a specified creep-rate, which is the conventional way of reporting data. If a minimum rate is not attained during test, the rate at the end of the test is selected, though this is evidently not a very desirable practice.

To evaluate any microstructural changes which occur during test, the specimens tested at any one temperature are divided into equal groups, one of which is subjected to the conventional room temperature tensile test and the other examined with respect to microstructural change, hardness, and notch-impact strength. This last property is determined on two 2/3 size Charpy-type specimens cut end to end from the general portion of the creep specimen, which are necessarily sub-size owing to the dimensions of the latter. The microstructure and hardness examinations are made on the broken notch-impact test specimens in a region sufficiently far from that cold-worked during the test.

As pointed out earlier, the creep-rupture test is nothing more or less than a creep test in which the stress is sufficiently high to cause rupture of the specimen while under test. A convenient indication of the stress required is given by the ordinary short-time elevated-temperature tensile test. For the first of a series of creep-rupture tests at any temperature, it is generally suitable to choose a stress 5000 to 10,000 pounds per square inch below the short-time elevated-temperature tensile strength; for the second, a stress some 10,000 to 15,000 pounds per square inch below, etc. Stresses in such a series generally plot against the time for failure, on a double logarithmic plot, as two straight lines.

Break away from the initial straight line is said to coincide with a change in mode of failure from

How We Beat Rising Costs by Changing to Welded Design

By Francis M. Wick, General Manager
Silver Manufacturing Company, Salem, Ohio

DESPITE the fact that costs have greatly increased in the past two years, the material costs of our "Ohio" Feed Cutter (Fig. 1) are no more today than on V-J day, due to the savings we have gained by changing to welded steel design.

The change to welded steel has also cut the machine's weight 24%, from 455 to 345 pounds—really a price decrease, since most of our sales are to foreign customers who pay duties assessed on basis of weight.

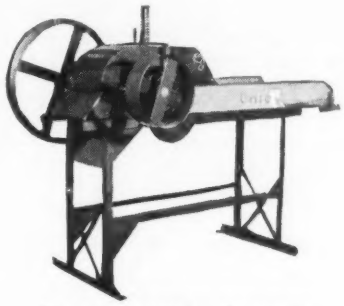

Fig. 1. The "Ohio" Feed Cutter.

We originally started experimenting with welded steel design because of the difficulty of getting a regular flow of parts. Our welding department has not only eliminated production bottlenecks, but has enabled us to increase production 79% with only a 20% increase in employees. The chief reason for this is that the parts of welded steel require much less machining, grinding and fitting than the former material. The same man-hours we formerly put into finishing now are used to prepare raw materials for the welding department and handle all finishing.

An example of cost reductions on the individual parts is the hood (Fig. 2). The hood made by the former method cost $1.99. We now fabricate it from three pieces of 12-gauge mild steel, flame-cut and brake-formed, for 94.3 cents, a saving of 52½%. Weight is also cut in half, from 17 to 8.5 pounds.

One of the interesting changeovers to welded design is the corrugated roll and shaft (Fig. 3). Weight was reduced from 18.5 to 11 pounds. The corrugated roll is now made of twelve angles, ⅛" x 1" x ⅝". Six of them at a time are inserted in a special jig and tack-welded together to form a half cylinder. The end discs, stamped from 12-gauge sheets, are slipped over the shaft and held in position for welding in a cradle-type jig. Then, using another special jig, the two corrugated halves are tack-welded to the discs. Tack welds give sufficient strength.

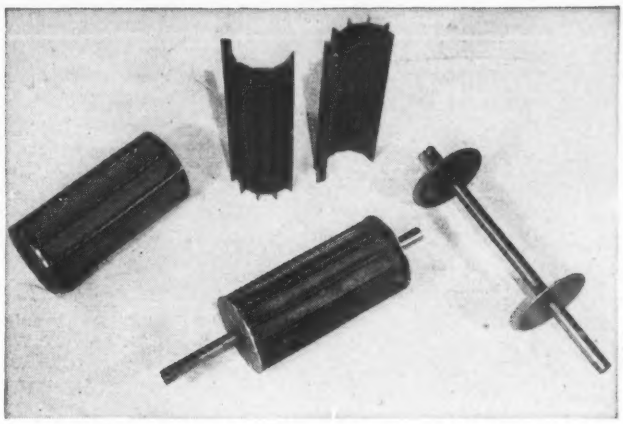

Fig. 3. At left is former corrugated roll. New welded roll and shaft (center) are fabricated from steel shapes as shown.

Welding the shaft and roll as an integral unit eliminates the man-hours formerly spent in machining and broaching keyways—a troublesome job.

In redesigning the flywheel (Fig. 4), weight was removed from the center, where it has a low moment of inertia, and concentrated on the rim, where it has the best effect. Thus the welded steel flywheel weighing 56 pounds has the same efficiency as the former design of 72 pounds.

The flywheel O.D. is 24". The rim is a 2" x 1¼" mild steel bar approximately 6' long which is heated, rolled and welded. Spokes are 3/16" x 2½" bars, drilled and broached at the center to match the hub of cold drawn tubing spaced between them. Welding is done in a jig which has a center post to hold the spokes and tubing in alignment, and three jaws which center the rim around the spokes. Each spoke is welded to the rim with a single pass, and two large tack welds join the hub to the spokes.

Other parts we have converted to welded design are the side plates, pulleys and smooth roll. The frame, formerly bolted, is now arc welded. All welding is done with "Fleetweld 7" electrode.

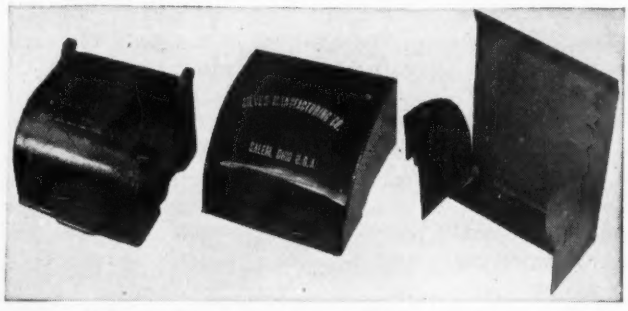

Fig. 2. Welded steel hood (center) costs 52% less than former design (left). How welded hood is made is shown at right.

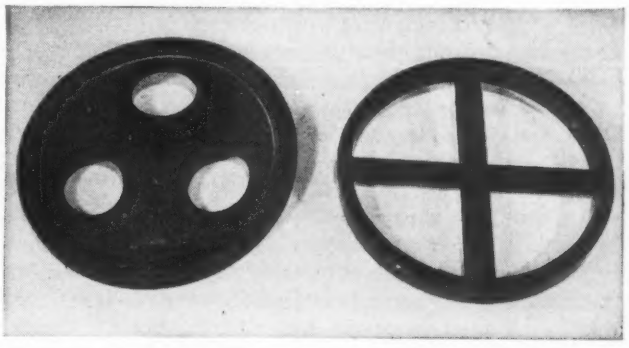

Fig. 4. The old flywheel was replaced by welded design (right) which weighs 23% less, but is just as efficient.

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transcrystalline to intercrystalline. In a nonoxidizing atmosphere, there is reported to be no change in slope at the point where intercrystalline fracture occurs, which is yet identical with that of the nonprotective atmosphere. The change in slope has been attributed to a weakening of the grain boundaries caused by oxidation. Time at which intercrystalline fracture appears seems to be greater, the lower the temperature. A convenient way of reporting the results of creep-rupture tests is in terms of the stress that will cause failure in some particular period of time such as 100 hours, or 1000 hours, or 10,000 hours; these are obtained by interpolation or extrapolation.

Although it has sometimes been ignored, the elongation and reduction in area in a creep-rupture test are significant. For example, two specimens which under the same stress rupture in the same time cannot be considered equivalent if one has extended 5 per cent and the other 50 per cent. Ordinarily the elongation is shown on a separate plot, or is recorded at the experimental points of the stress-time plot. Generally the elongation tends to diminish as time for rupture increases, and in an erratic fashion.

Both creep-strength and rupture strength as employed in the design of a structure for long-time service at elevated temperature necessarily involve extrapolation. The rupture strength can be extrapolated with a fair degree of confidence owing to the well-defined relation between stress and rupture-time. Creep strength can be extrapolated with less confidence, owing primarily to uncertainty as to when the extension-time curve will enter into stage 3.

Because of this latter fact, it is well to consider also the rupture strength even when the amount of distortion is the primary concern, for doing so will at least insure that actual rupture does not occur. As an example, we might take the data for 18-8 (Type 316). At 1300° F, the stress to produce a deformation of 1 per cent in 10,000 hours (0.0001 per cent per hour) is 9500 pounds per square inch, let this be the stress we choose, on the basis of the permissible distortion, for a structure which is to last 10,000 hours. We then extrapolate the 1300° F stress vs rupture-time curve to the stress of 9500 pounds per square inch and find that the time for rupture at this stress is 60,000 hours. Thus the design stress appears to be relatively conservative with respect to whether or not rupture occurs. In an actual design, a factor of safety will, of course, be applied.

When the distortion occurring in a structure used at elevated temperature is of no consequence, design can be based on rupture strength alone except insofar as one might wish to use the distortion as a measure of impending rupture.

From data presented by the authors at annual meeting, ASTM, Atlantic City, N. J., June, 1947.

Ductility of Steels—*Continued from Page 92*

The exceptions are in line with the observation that occasional specimens of as-rolled material gave better—that is, lower, temperatures for embrittlement than did the normalized.

Carbon is a most important single element in determining level of the embrittling temperature. This is shown in Fig. 7. Alloys, however, generally have a major effect in improving the behavior of the steel; that is, lowering the embrittling temperature for a given strength level. Number of heats available and the presence of some unknown factor prevent warrantable conclusions with respect to the effects of individual alloys or alloy combinations, although the combination previously developed for low temperature service—namely, chromium-copper-nickel, has merit beyond other compositions tested. It should be repeated, however, that this is a low strength steel, whereas commercial low-alloy steels are high strength steels. Further work may well enable a quantitative estimate of the effects of individual alloys or combinations, but such work must await the determination of that very important factor in steelmaking not as yet established. lished.

The existence of such a factor is well illustrated by the difference in performance of the commercial and laboratory heats. Careful inspection of the analyses of the laboratory heats indicates either no significant difference in chemistry or, where such difference was indicated, check work showed that it was not the determinant. Obviously, there is no difference between laboratory and commercial heats with respect to carbon, manganese, silicon and incidental alloy content. Further, although the sulphur and phosphorus in the laboratory heats are lower than in the commercial heats, sufficient other work has been done, although not yet reported, to show that these elements are not controlling within the limits here studied.

Aluminum, Nitrogen Contents Similar

There was no substantial difference between aluminum contents either soluble or insoluble, and the nitrogen contents were of the same order of magnitude. The steels were not analyzed for hydrogen, but we have sufficient background on similar heats to know there is no significant difference in the hydrogen content of the laboratory and commercial heats. There is nothing in the practice used for making laboratory heats to give a clue as to that dominant factor which results in such low embrittling temperatures for these steels as compared with commercial steels.

This difference between the laboratory and commercial heats is not a new observation. The condition has existed in our laboratories for many years, and the search for an explanation of that difference has been continuous but without results.

Those who have worked in this field may find it strange that up to this point no specific mention has been made of three-dimensional stress and of internal stress, each of which has loomed large in past considerations of the subject. Actually, three-dimensional stress is automatically incorporated in the test specimen. It is a major factor in restraint, and everything which has been said pertaining to the notch and its effect applies directly to the three-dimensional stress problem. The specimen does test material with a polydimensional stress pattern in the critical zone.

The situation is not quite the same with respect to internal stresses. On welding, internal stresses usually are relieved by small plastic deformation. If the design and welding conditions are particularly severe, more plastic deformation is necessary to relieve these stresses. The test does guarantee a minimum amount of such deformation for the usual structural steels, and therefore does indicate satisfactory welding response under reasonable design and welding engineering. No test can guarantee satisfactory performance under the worst design and worst

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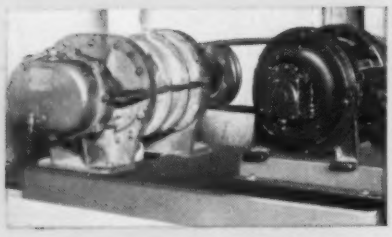
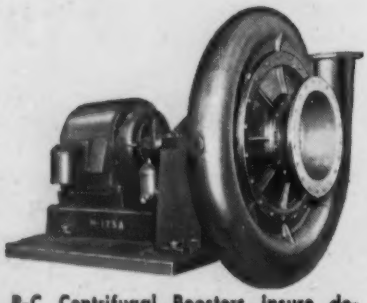


R-C Rotary Positive Blower built into modern gas-oven equipment to maintain constant, correct gas flow for even baking temperatures.



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welding conditions, nor should any steel be called upon to meet such. The specimen may be tested as welded or after postheating, depending on the service analogue.

Any metallurgical change produced by stress relieving will be truly reflected, but internal stress relief would not be so reflected. In such a case, the specimen is more conservative than need be. Nothing in this presentation should be interpreted as lessening the important benefit of stress relieving.

Tests Involving Welding

Consider then how the test would be applied by engineers and manufacturers when welding is involved. The general specification would read to the effect that a specimen 3 inches wide, 8 inches long, with thickness the same as the plate, be used for deposition of a weld bead by the process in question and under specified welding conditions. If a thick plate is involved, the bead should be deposited on a larger specimen, which would then be cut to 3 inch width. The weld bead is to be parallel to the length and along the center of the specimen. The specimen may be strained before welding. Subsequent to welding, an Izod notch is milled 0.05-inch deep across the specimen, and the edges of the specimen near the notch are shaped parallel.

A micrometer caliper measurement 1/32-inch below the notch is taken on the parallel sides, and the specimen and ram head are cooled to test temperature (generally 1/2 hour). The specimen is then tested in bending on a 4-1/2-inch span, using rollers for support and a 1/4-inch radius ram for loading. Only a single test temperature need be used. This test temperature is a matter for engineering judgment and should be related to the intended service. Temperatures have been suggested for typical applications. Specimen performance should be minimum 1 per cent lateral contraction at the test temperature.

Factors of Safety

These suggestions contain two types of safety factors. First, the embrittlement temperature is set for 1 per cent lateral contraction, and this in itself comprises an appreciable amount of plastic flow. Unless an extremely sharp notch was already present in the member, failure would not be expected at the temperature of test. The second item in the factor of safety is found in that the test temperature set forth is appreciably lower than generally encountered for the corresponding service, although the temperatures of outdoor structures and ships may occasionally be lower. In this connection it should be emphasized that ductility in itself is no more than a factor of safety. The fact that ductility may be reduced to low levels does not necessarily mean that failure will occur in that piece.

Test conditions were chosen to provide an analogue to normal design, but the design engineer can do much to increase the ductility of the structure. The sharp notch in the specimen is chosen to represent high stress concentration and high restraint. In any given structure, these items can be kept to a minimum by proper design. Most designers have learned to avoid sharp notches and to use generous fillets. It should be emphasized that stress concentrations can result from other items in the over-all design, and so can high restraint. An engineering design producing such conditions is just as bad as one without fillets. The modern design engineer should learn to appraise as well as avoid defects such as these.

The test may likewise be applied to steel for nonwelded structures either in static or dynamic service, and it is suggested that in general this test could well be used by the engineering profession to replace the notched bar impact test. That test measures a complex function involving both strength and ductility factors, yet generally it is intended to evaluate ductility only. The test here presented eliminates those factors comprised in the general term "strength", and tells the story with respect to ductility, and ductility alone.

Formula Revision for Gas Combustion Article

In the article "Gas Combustion Equipment", STEEL, Sept. 22, p. 106, the following formula corrections should be noted: Column two, top—

$$Q = 1658.5 \times K \times A \times \sqrt{\frac{P1 - P2}{D}}$$

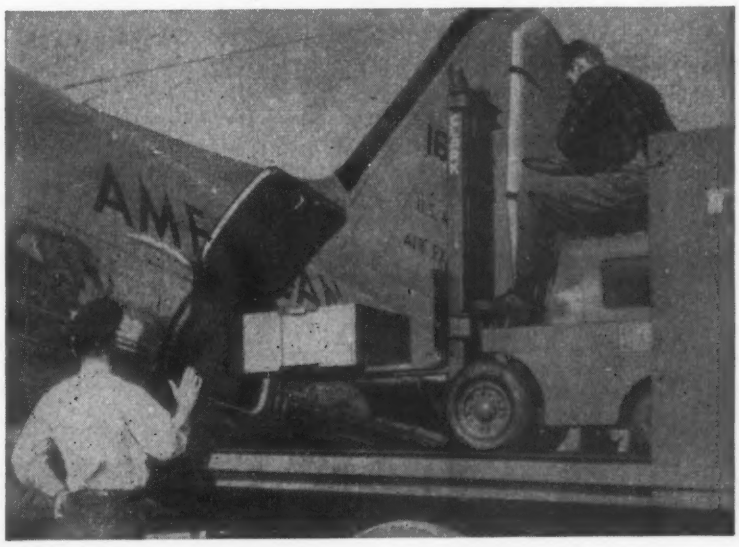
Bottom, same column—

$$Q = \frac{1104.3 \times A \times K \times (P + 14.7)}{d\sqrt{T}}$$

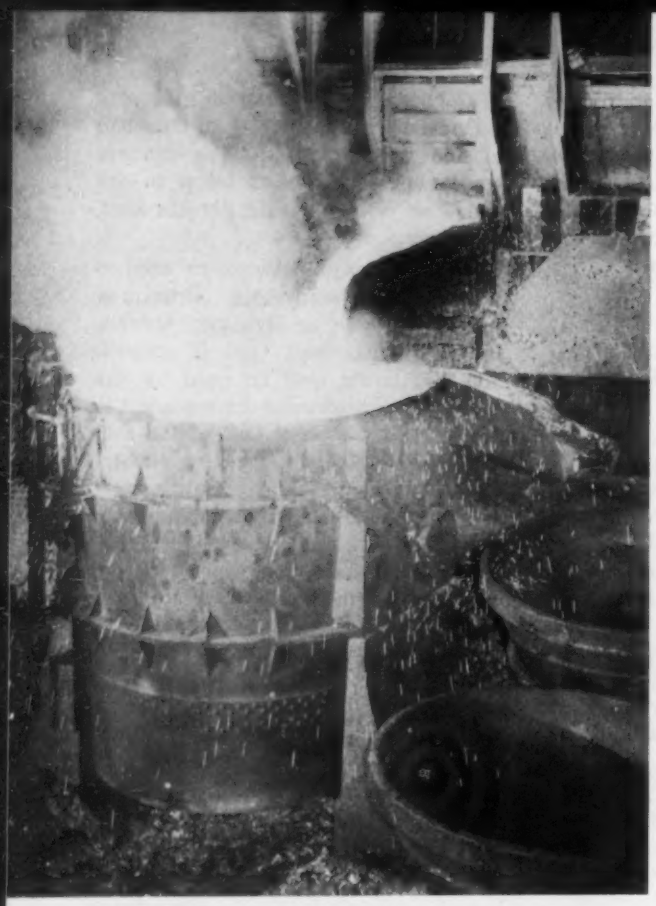
Column three, under Velocity Pressure—

$$V \text{ (feet per min.)} = 4005\sqrt{\frac{h}{d}}$$

$$Q = 1669 \times A \times \sqrt{\frac{h}{d}}$$



HANDLING AIR EXPRESS: Using a new Trucloader, a machine small enough to operate on the bed of a motor truck and strong enough to lift 1000 lb, the Clark Tructractor Division of Clark Equipment Co., Battle Creek, Mich., recently loaded two 344-lb crated Utilitruc wheels into the air express compartments of an American Airlines plane. Wheels, with tires pressed on, were loaded on a company truck, along with the fork-equipped materials handler which served to load the crates in two different compartments of the plane—all within the scheduled 5 minute stop



Elevated temperatures in the open hearth are dependent upon the checker system

Fundamentals of

OPEN-HEARTH CHECKERWORK

Design

Effective 2-pass operation involves a long, narrow and deep mass of flues preferably of large size to minimize dust accumulation. Modern 3-pass checkers call for ample heating volume, short flame firing, minimum carryover and induced draft

By HORACE W. POTTER
Junior Consultant
Arthur G. McKee & Co.
Cleveland

ASIDE from any factor of economy, regeneration must be included as a part of open-hearth furnaces for elevated temperatures of the process cannot be developed without it. Regeneration really creates a 2-stage combustion process. Instead of burning fuel and releasing the heat of combustion at atmospheric temperatures as with cold air, the heat of combustion with regeneration is released at the temperature plane of the air preheat. Thus, the combustion of the fuel gains in pyrometric flame temperature a portion of that temperature delivered in the preheated air.

While regeneration is fundamentally necesary for the creation of temperature it contingently returns a considerable quantity of fuel to the operation in the combustion air as sensible heat. Assuming that excess air entrainment in the waste gases is nominal, overall fuel economy in a given installation may be developed by increasing the preheat above the present plane.

An old rule of economy in open-hearth practice which has been well proven, is that each Btu of sensible heat returned in the preheated air is equivalent to 2 Btu of primary fuel. An increase of 100 degrees in preheat temperature is equivalent to about 3 per cent of primary fuel.

Perhaps the only justification for the following comments is that they may aid open-hearth steelmakers who believe that their operations could be benefited by a rearrangement of existing regenerator facilities. The accompanying data are not offered as a key to the design of new furnaces.

The question of checker design does not at present rank the importance with respect to overall operations it did only a few years back when many shops were still firing with producer gas, and those few who were firing with the fixed fuels had not learned how to burn that fuel in the upper furnace. In those days through the fouling or destruction of the checker work as the result of producer gas and long flame firing, and the ensuing heavy carryover of solids of one sort or another, open-hearth operators were ever in search of checkerwork design that they hoped would prove a panacea for above-floor operating deficiencies. Happily today they are not burdened with producer-gas operation and the open-hearth technologist and fuel engineer have caused fuel to be consumed in the furnace laboratory and not in part in the slag pockets and regenerators. This in itself is no small achievement, for due to increased production demands many of the older 40 or 50-ton furnaces are now tapping double the tonnage for which they were originally intended, often with but little or no expansion of the furnace or regenerator structure beyond the original lines.

In the older days steelmakers dealt mostly with two sizes of checker brick, namely the 9-inch standard, 9 x 4½ x 2½ inch and the 10½ x 4½ x 4½ inch. The former developed a 6½-inch square flue and was unstable structurally while the latter gave a 6-inch square flue, and was very stable structurally, though its bulk caused a material loss of gross flue area.

The gradual increase of heat time and fuel rate as a campaign gets older, is in a great degree due to progressive fouling of the checker system and its increasing deterioration as a heat transfer device. The thermal strains caused by continual reversals tend to cause the checker brick to become increasingly porous on the surface developing an excellent insulating material with poor heat transfer capacity. Hence, we recommend that the checkers be removed after every campaign, the bottom third replaced with new brick, and the top third discarded. Removal of the checkers also offers the opportunity for a thorough cleaning operation. Therefore, the initial concept of checker design is the development of means or methods to reduce fouling and poor heat transfer surfaces, and by so doing to maintain a higher average heat transfer rate through the furnace campaign.

Accomplishment of this result involves two factors, first that of up-

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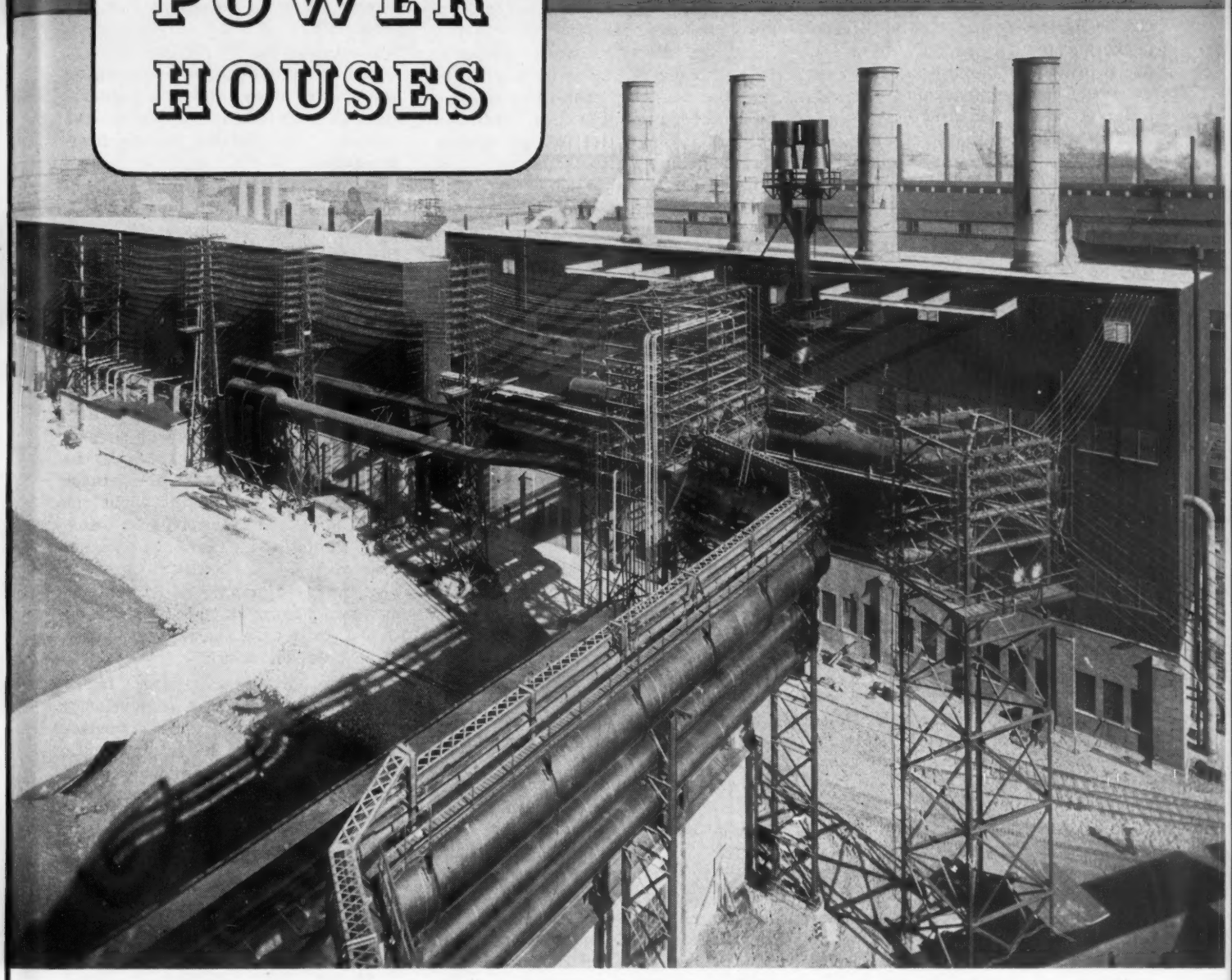
POWER HOUSES



IN recent years the McKee organization has undertaken design and construction of eighteen power houses in domestic and foreign locations. More than half of these plants are now in operation, the balance being in various stages of completion. These power houses were designed to operate turbo blowers for blast furnaces, to generate operating power, to provide process steam for petroleum refining and miscellaneous industries and for general steam purposes. The combined generating capacity of these eighteen plants is over 5,500,000 pounds per hour of steam generated.

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per furnace design and operation, and second that of detailed regenerator design. The solution of the first factor is necessary to some degree before much progress will be possible in the second. But little improvement in checker work performance can be reasonably expected until slag pocket accumulations have been reduced to the minimum, which can generally be brought about by a good order of combustion practice in connection with an improved furnace end design that will probably require the judicious inclusion of high-grade refractories.

Assuming that combustion and slag pocket effects have been improved and are reasonably good, what then are the principal requirements that should be included in the design of the checkerwork in the regenerators?

Today regenerators are of two types, the common simple or single pass, and the more advanced 3-pass arrangement. The latter requires special consideration and hence the immediate discussion refers only to the single-pass design.

Three prime factors of checkerwork design are volume, mass shape, and checker brick size. Late experience has indicated that satisfactory fuel performance should follow if furnace gas temperature of the regenerators operate between 600 to 800 degrees on the cold end of the reversing cycle and 1100 to 1300 degrees on the hot end. This is an average outlet temperature of about 900 to 1100 degrees. It is usually not economic to carry regenerative outlet temperatures below these values by means of enlarged refractory regenerator structures.

The foregoing conditions necessitate sufficient temperature of brickwork at the hot end of the regenerators. The average should be at least 2700 degrees so that the temperature of combustion air at the burner is above 2000 degrees. Combustion air temperature should increase about 200 degrees in the slag pocket and uptakes. Usually the temperature entering the degenerators will be about 500 degrees. Maintenance of proper waste gas and air temperatures will in no small degree depend on the order of platform operation and the physical condition of the furnace, slag pocket to slag pocket.

The foregoing establishes the following values as good temperature conditions within a regenerator, namely:

Furnace gas:	Degrees Fahr.
Intake	2700+
Outlet	900-1100 (Avg.)
Air:	
Intake	500 (Approx.)
Outlet	1800+

These conditions develop a mean temperature differential factor of about 600 degrees which can be assumed as a satisfactory value for average open-hearth furnace operation. Having established the temperature conditions, three design factors are considered. If the heat transfer from the checker surfaces amounts to ¾-Btu per degree temperature differential per hour, then for a 600-degree differential the heat transfer should amount to 450 Btu per square feet per hour.

Checker Volume: Before the volume of the checkerwork can be established it will be necessary to have a good idea of the work a regenerator will be called upon to do. Therefore, the quantity of heat and the volume of the furnace gases that will contain that heat must be known with a fair amount of accuracy.

Today many open hearths are operated on a basis of an average hourly heat input and this fuel rate is carefully watched to be assured of the least waste or misuse of fuel. Thus, in the case of a 100 or 125-ton furnace unit the optimum fuel input may be in the order of 50 million Btu per average hour which of course presents the basis for the required checker volume.

Assuming the use of our common fixed fuels, i.e. natural gas, coke-oven gas or oil, and adding the bath vapors plus 20 per cent excess air at the regenerator entrance, the volume of the furnace gases, resulting from the burning of any of these fuels will be similar, or about 13,000 cubic feet at standard conditions, per million Btu of fuel input.

Based on the foregoing conditions, and long and varied experience in design and operations, the volume of the checkerwork to include the rider tile should generally be about 100 cubic feet at each end of the furnace, or 200 feet total for a complete furnace, per 1 million Btu of primary fuel consumed per average hour, provided that the regenerator mass is of reasonably good shape, approved checker brick are used, and cleanliness is maintained. Thus, against an average fuel consumption of 50 million Btu an hour, the air checkerwork volume should be in the order of 5000 cubic feet per regenerator or 10,000 cubic feet per furnace. However, few of the older furnaces and particularly those furnaces of enlarged capacity, have more than 75 per cent of the desirable volume.

Mass Shape: Due to building or other limitations it is often not possible to secure the best dimensional design of checkerwork. Fundamentally the checkerwork should have considerable length, relative narrowness and much depth. This causes the voiding furnace gases to follow a rough diagonal line from hot entrance to exit, and of greater importance, causes the combustion air to follow the same general line in reverse in order to accomplish the greatest heat transfer, prevent overheating and failure of any portion of the checkerwork. The combustion air, which passes through a regenerator, is only about two-thirds the volume of the counter flowing furnace gases.

The length of the checkerwork will usually not exceed 25 feet and may be much less. It will be the first checker dimension established and will be the result of joint studies by the building and furnace designer. It should be as long as possible.

The width dimension presents the first real design problem, for irrespective of length, the width must be sufficient so that after the checkerwork is in place there will be sufficient free flue area through the mass to cause the waste furnace gases to flow through at about the optimum velocity for good heat transfer. The 9 x 4½ x 3-inch checker brick develops the least free area, 44 per cent, of any of the common standard shapes in use and thus offers a good base for the calculation of checkerwork width.

The author uses a maximum factor of 2.5 feet per second relative velocity as a desirable speed for the furnace gases through the mass at specific temperature conditions, which taken in connection with the furnace gas volume determines the free flue area required and the width of checkerwork. If the required width of the checkerwork exceeds 18 or 20 feet it will probably be wise to use a centerwall to reduce the height of the regenerator roof if of arched design.

As previously mentioned a 100-ton furnace might consume 50 million Btu per hour and pass 13,000 feet of furnace gas per unit of fuel. Assuming a checkerwork length of 20 feet, checker flue openings equalling 44 per cent, 2700 degrees at the top of the mass which equals a relative volume factor of 2.536 (the square root of the expanded volume factor at 2700 degrees, namely 6.4285) and assuming a 2.5 foot per second relative velocity, the required width of the checkerwork is determined as follows:

$$\text{Width} = \frac{50 \times 13{,}000 \times 2.536}{3600 \times 20 \times .44 \times 2.5} \text{ or } 20.9 \text{ feet}$$

The area of checkerwork may now be found as 20 x 20.9 or 418 square feet. Recalling the factor of 100 cubic feet per 1 million Btu of fuel.

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MIX 827

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ANALYSIS

Carbon	.70%	Nickel	1.65%
Manganese	.40%	Chromium	1.00%
Silicon	.20%	Copper	.35%

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STEEL—Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

HENRY DISSTON & SONS, INC., 1226 Tacony, Philadelphia 35, Pa., U. S. A.

The Model 18 is another outstanding product on which we proudly put the Binks name.

J. L. Roche
President

There's just one way you can really appreciate the exceptional qualities of the new Binks Model 18 spray gun and that's to examine it. Take this spray gun in your hand . . . feel its perfect balance! Pull back on the smooth-operating trigger . . . note the uniform, controlled coverage! Take it apart . . . study the unequalled precision of its manufacture. Then, we are sure, you will agree with other spray finishing experts that this is the finest spray gun of them all!

And when you see how Model 18 stands up under hard, continuous production-line operation . . . handling any material . . . giving uniform, fine finishing long after most other spray guns have worn out . . . you'll know that the 18 has no equal for performance or economy!

Truly, the new Model 18 is the crowning achievement of years of engineering development that have made Binks spray guns and equipment the standard in America's leading industries.

Specifications:

Controls: Convenient back-of-gun location. Spray pattern fully adjustable from round to flat.

Body: Strong drop-forged aluminum with long-life black electrolytic coating.

Head and Air Nozzle: Tough drop-forged bronze heavily plated.

Material Nozzle: Hardened steel. Self-centering. Tapered seat.

Needle Valve: Hardened steel. Easily adjusted to compensate for wear.

Air Valve: Efficient cartridge type.

Other Features: Trigger protected from wear by hardened back plate. All parts are of wear and corrosion resistant materials. Large air passage through gun increases efficiency. Standard thread connections. Air hose ¼", material hose ⅜".

Model 18V—The same gun adapted for use with ceramic materials. Tungsten carbide inserts in material nozzle and needle valve insure long life.

See your local jobber or write direct for full information and prices

Binks **MANUFACTURING COMPANY**

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Windsor, Ontario, Canada

the height of checkerwork evaluates as:

$$H = \frac{50 \times 100}{418} \text{ or 12 feet.}$$

Therefore, for the open-hearth furnace consuming an average of 50 million Btu per hour, the optimum dimension of checkerwork should be about in the order of, 20 feet long, 20.9 feet wide and 12.0 feet high.

If due to local conditions, abridgement of dimensions becomes necessary, the reduction of width should be first considered, for here a 20 per cent reduction would cause an increased velocity of the same order and such an increase would not be too disastrous if other conditions can be met. Any reduction of length should be argued against vigorously. Often in the older plants the requirements as to height cannot be met without major rebuilding, so the only comment offered is to keep the height as much as possible.

The foregoing discussion assumes ample transverse areas over and under the mass. The latter should include sufficient volume of space to allow a considerable accumulation of dust without interference with flow conditions.

Checkerbrick Size: As is known there is always a considerable carryover of fine dusts which accumulate in the checkerwork. These dusts usually consist of more than 60 per cent oxides of iron, while the balance consists mostly of lime, silica, and zinc oxide. If these dusts lay undisturbed on the hotter brick surfaces, they are prone to sinter thereon, causing reduction of checker flue area and militating against heat transfer effect.

Today we counter these effects by endeavoring to reduce the surfaces where lodgement can occur and arrange the horizontal openings so that frequent and periodic blowing may be accomplished. In most present day plants shutting down during a campaign for checker cleaning is unknown. The increase of fuel rate, averaged by 40 heats over perhaps a 300-heat campaign, will only be about 15 per cent towards the end of the campaign.

If a 6 x 6-inch flue opening is provided, most operators prefer to carry this unbroken from top to bottom so that dust entering at the top is free to fall through to the bottom where it will do the least harm.

The best size of checker flue opening is the smallest found by experience that will go through a campaign with the least fouling and which continues to show only a small fuel rate rise during the older portion of the campaign. Particularly with oil firing a 7½ x 7½-inch mini-

7 shafts, 11 gears— kept in line by Timken bearings

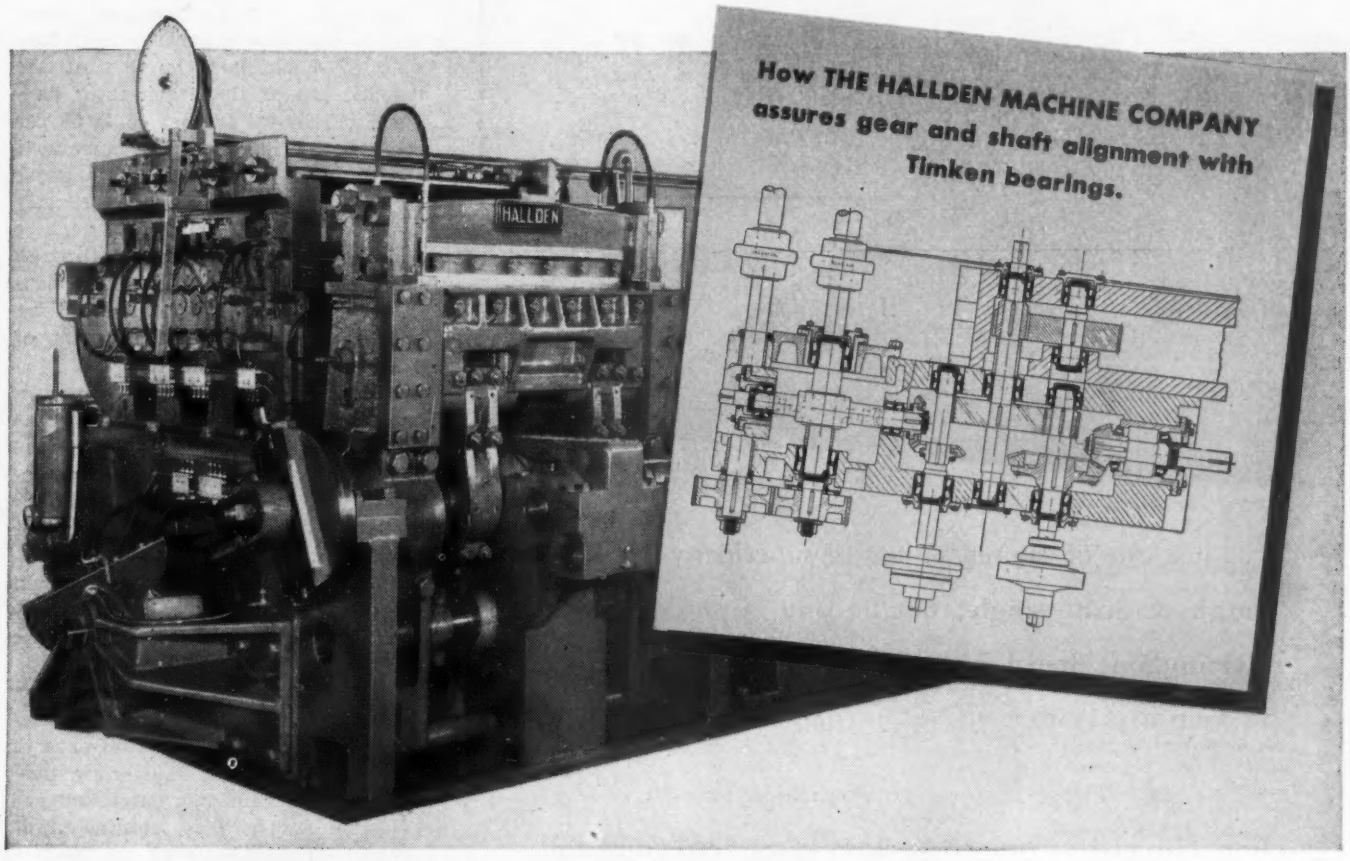
THE Hallden Machine Company assures efficient power transmission in their guillotine flying shear through the use of Timken tapered roller bearings. Timken bearings hold shafts rigidly in line—keep gears in proper mesh. Maximum bearing capacity to carry the load of the shearing operation is provided in minimum space. Power is saved due to the friction-free operation of Timken roller bearings. Lubrication is simplified.

Timken bearings are tapered in construction—can carry any combination of radial and thrust loads. They're manufactured to incredible precision, finished to amazing smoothness. They permit closures which effectively retain lubricant, exclude dirt. The line of contact between rolls and races provides maximum load capacity. And since they're made of the finest bearing material ever developed —Timken fine alloy steel—Timken bearings last the life of the machine.

Remember, no other bearing can bring you *all* the advantages you get with Timken bearings—backed by 49 years of bearing research and development. That's why it's so important to make sure you have Timken bearings in every machine you manufacture or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.



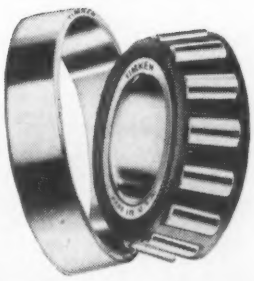
FINISHED TO CLOSE TOLERANCES

Honing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. Timken is the only bearing manufacturer in the country which makes its own steel, and leads in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Extra Wide Face Gears

GUARANTEE LONG LIFE

. . . just one of the ten points of superiority of Horsburgh & Scott single, double and triple reduction Herringbone Speed Reducers . . . in ratios from 2.31 to 1 up to 429 to 1.

● These features insure quiet, smooth operation with maintenance cost close to the zero point and exceedingly low depreciation, even under very heavy shock loads and other difficult conditions of service.

Send note on Company Letterhead for Speed Reducer Catalog 46

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

mum or even better a 7½ x 9-inch flue is preferred as being easier to keep clean.

Proper thickness of checker brick is the thinnest possible that will produce structural stability. If 2½-inch thickness has been found to give satisfactory results in your practice, by all means continue to use it or if not the 3-inch size should meet all conditions.

With the usual 15 or 20-minute reversal period of open-hearth practice, probably not more than ¼-inch of the heated brick surface is utilized as a heat transfer medium, and consequently thickness is only a factor concerning gross flue area and stability. The width of the brick should preferably be 6 inches, for this size of brick lays up easily and quickly, and due to its mass will take considerable abuse without breakage.

So much for the single-pass regenerator. The 3-pass arrangement consists of a checker chamber at the furnace end of the regenerator having a horizontal area of 45 to 50 per cent of the single-pass arrangement and through which the waste gases from the slag pocket pass vertically downward, turn through 180 degrees and move vertically upward through the central or idle pass. The idle pass with its large flues and two limiting walls occupies about 15 per cent of the horizontal regenerator area.

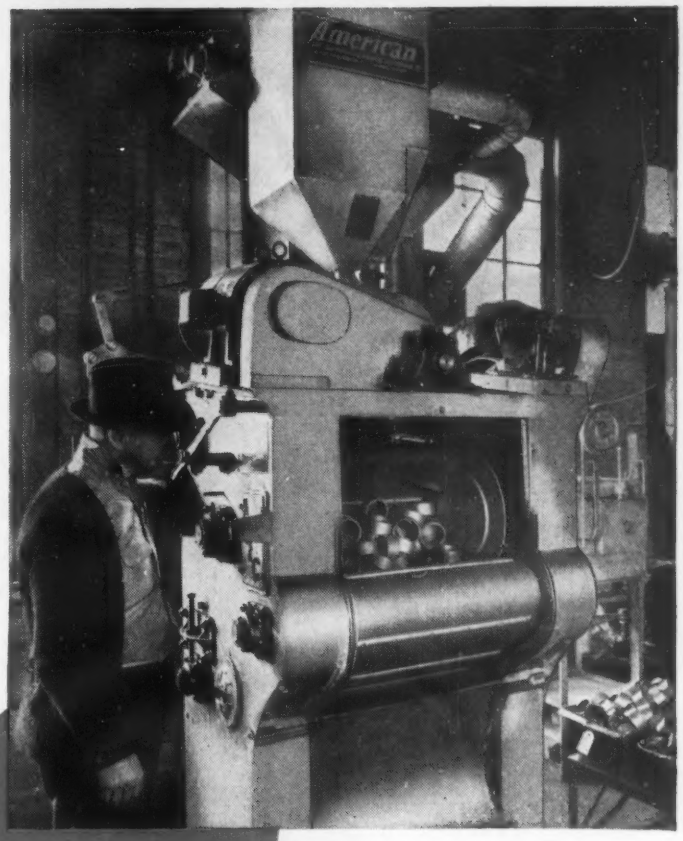
Next the furnace gases again turn through 180 degrees, enter and pass vertically downward through the third pass checkerwork to the regenerator outlet. The third pass will have 35 to 40 per cent of the regenerator area.

It is obvious that conditions within the 3-pass arrangement are vastly different from those found in the simple type.

As the gases are to be received in the first pass by not more than one-half of the surface and flue area of the single-pass type of checker, dust action will be much greater and gas velocity doubled. This requires ample accumulation volume at the bottom of the first pass and effective service by the induced draft fan. Inspection of the first pass during operations or any measure of blowing or cleansing is almost impossible, and consequently failure of any brickwork in this part necessitates a complete shutdown and cooling of the furnace before the chamber can be entered.

Therefore, the prerequisites of any measure of successful 3-pass regenerator operation include ample prime regenerator volume, the practice of short-flame firing, the reduction of carryover from the slag pockets to a minimum, an effective induced draft

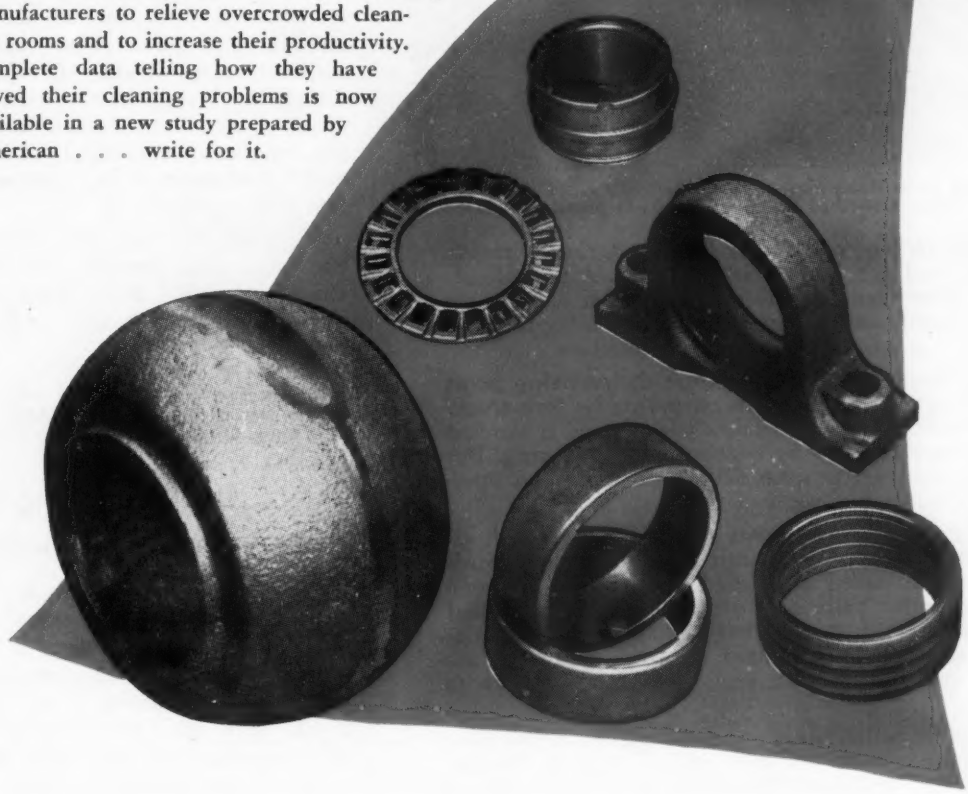
Wheelabrator's thorough cleaning helps to speed production in the BEARING INDUSTRY



The torrent of abrasive, hurled by the Airless Wheelabrator, scours every surface brilliantly clean in but a few minutes. Loads of bearing castings that formerly required 30 minutes to three hours for cleaning by other methods are now cleaned by the Wheelabrator in 4 to 12 minutes. For example:

At the Heppenstall Co., Bridgeport, Conn. a Wheelabrator Tumblast cleans 200 inner races for S.K.F. and Hyatt bearings in 8 minutes. This work previously required 4½ hours by hand in a sand blast room.

The amount of time and labor saved through the use of a Wheelabrator has enabled Bearing Manufacturers to relieve overcrowded cleaning rooms and to increase their productivity. Complete data telling how they have solved their cleaning problems is now available in a new study prepared by American . . . write for it.



TYPICAL USERS

Aetna Ball Bearing Co.
Bower Roller Bearing Co.
Bantam Bearing Div.
Canadian Bronze Co., Ltd.
Cleveland Graphite Bronze Co.
Dodge Mfg. Co.
Fafnir Bearing Co.
Hyatt Bearing Div.
Fischer Foundry Div.
Bound Brook Oil-less Bearing Co.
Kaydon Engineering Co.
Marlin-Rockwell Corp.
McGill Mfg. Co.
Link Belt Co.
Magnus Metal Division
National Bearing Metals Div.
Nice Ball Bearing Co.
S. K. F. Industries
Spicer Mfg. Co.
Timken Roller Bearing Co.
Norma-Hoffman Bearing Corp.
Arnold, Schwinn & Co.
Tyson Roller Bearing Co.
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Bunting Brass & Bronze Co.
Johnson Bronze Co.
Ford Motor Co.
Roller Bearing Co. of America
Burgess Norton Mfg. Co.
Toronto Foundry Co.

Write for our latest treatise "CLEANING PROBLEMS SOLVED In the Bearing Industry". Contains complete case history data, and a wealth of other material applicable to the Bearing Industry.

THE AMERICAN MOLDER TRADE MARK REG. U. S. PAT.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
509 S. Byrkit St., Mishawaka 5, Indiana

2 STEPS in Cutting Costs of Handling Bagged Material

1 Install BAKER Fork Truck and Pallets

This will eliminate the back-breaking labor of handling individual bags manually, cut time and cost of car-loading or unloading, add storage space by tiering, and speed inter-department handling.

2 Get Suppliers to Palletize Shipments

This will cut time and cost of unloading incoming material. Supplier will make corresponding savings at shipping end with Fork Truck-Pallet combination. Damage in transit minimized.

Baker Fork Truck tiering pallet loads of bagged starch in storage. Note method of "locking" sacks to prevent side-slipping.

AT THE ERIE, PA. PLANT of one of our customers, raw materials such as clay, starch and talc, are received in bags. A typical carload will contain some 1600 bags, weighing about 50 lbs. each. These bags must be unloaded, stored, and transported to process departments as required.

This company took Step No. 1 years ago, and from the receiving point all bagged materials are carried in unit loads on pallets by fork truck. This has resulted in substantial savings each time the material is handled and has increased warehouse capacity by permitting high tiering. But bags not on pallets when they arrive must first be palletized—an operation requiring about 14 hours per car.

Step No. 2 is now under way. Arrangements are being made with all suppliers of bagged materials, to ship in unit loads, on pallets. Such carloads can be completely unloaded and stored in not much over two hours—as against 14 hours for palletizing alone. Since no individual man-handling of bags is required, heavy labor is eliminated, and damage from handling and shipping is minimized. Comparable savings are realized by suppliers at the shipping end, making it possible to improve deliveries.

Savings possible by complete palletization are demonstrated at the same plant in the case of shipping cartons. For these, which arrive in "knock-down" condition, the company furnishes the supplier with special four-way pallets—and the "flats" arrive in unit loads strapped to these pallets. Unloading and warehousing now takes about three hours per car, where formerly, when "flats" were received unpalletized, it took 24 man-hours for the job.

Let a Baker Material Handling Engineer show you how you can save money with fork trucks and pallets.

See us at Booth 303
Materials Handling Exposition
CLEVELAND—JANUARY 12-16

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway & Power Engineering Corp., Ltd.

Baker INDUSTRIAL TRUCKS

system, and a high order of design.

It is generally acknowledged that larger flues are necessary in the first pass and 7½ x 7½ inches seems to be the minimum. Super duty brick are also commonly employed.

As temperature and dust effects are nominal in the third pass small flues such as 6 x 6 inches are usually found to be satisfactory.

Three-pass checkers are installed in regenerator chambers that were originally designed for single-pass operation with good results in cases where the original design was sufficiently ample to allow proper development. However, when such was not the case the results have consistently been disappointing. The proponents of 3-pass checkers are usually enthusiastic as to the results secured from their use. While it appears there may be some justification for such enthusiasm, the betterments claimed might in part at least be found to result from the more careful operating technique necessary to this type of operation.

To sum up, for simple checkerwork a relatively long, narrow and deep mass is best. Flues should be large rather than small, offering the least opportunity for dust lodgement. Clean checkers are a prime necessity for continued successful operation, and a good order of combustion practice must be developed.

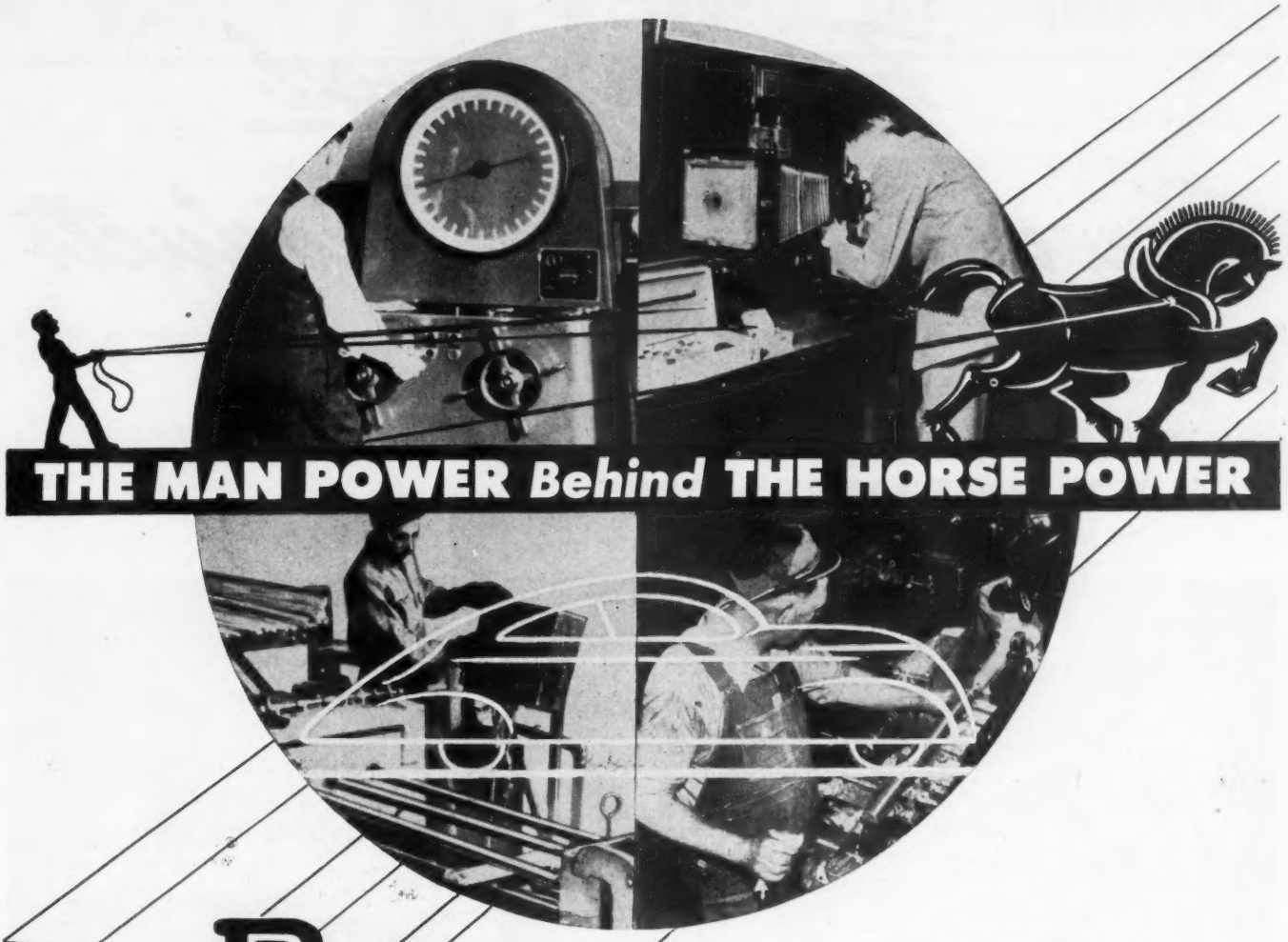
Requirements for the successful use of 3-pass checkers are ample chamber volume, short flame firing, minimum carryover and induced draft.

This paper was presented at the Eastern Section Meeting of the National Open Hearth Committee, A.I.M.E., Philadelphia, Oct. 17.

Movie Details Ways to Cut Costs in Materials Handling

Ingenuities in electric truck manipulation devised by clever users of such equipment are shown in a 16 mm motion picture narrated by Lowell Thomas and released by Yale & Towne Mfg. Co., Philadelphia. The film visualizes how a reported 30 per cent of the production dollar goes into the movement, lifting, storage, rehandling and shipping of materials, adding only to product cost and not to product value. Purpose of the film is to demonstrate ways to reduce this cost.

Included in the 40-minute production are actual scenes showing materials handling systems in operation in the plants of 20 companies, among which are Gisholt Machine, Square D, International Harvester, Chrysler and Youngstown Sheet & Tube.



THE MAN POWER *Behind* THE HORSE POWER

B&L TEAMWORK *insures Better Steels*

By close cooperation with manufacturers of machinery and equipment, we are able to produce Cold Finished Bar Steels that keep pace with advances in design, and contribute to product improvement.

This teamwork not only results in better cold finished steels but also helps to improve fabricating operations and increases the service life of vital parts going into your products.

For making small machine parts, B&L Carbon Bars are available in a full range of Free-Machining Steels, Bessemer and Open-Hearth Screw Stock, specially developed for use on modern, high-speed automatics.

For high-strength applications or wear-resistant parts, B&L Alloy Bars are furnished in all standard grades . . . including sulphurized grades and annealed bars where extensive machining is involved.

Refer your cold finished steel problems to our engineering staff for specialized steel service.

Cold Drawn Bars
Furnace Treated Bars
Free-Machining Steels
Cold Finished Shafting
Alloy Bar Steels
Special Sections

COLD FINISHED BAR STEELS AND SHAFTING

BLISS & LAUGHLIN, INC.

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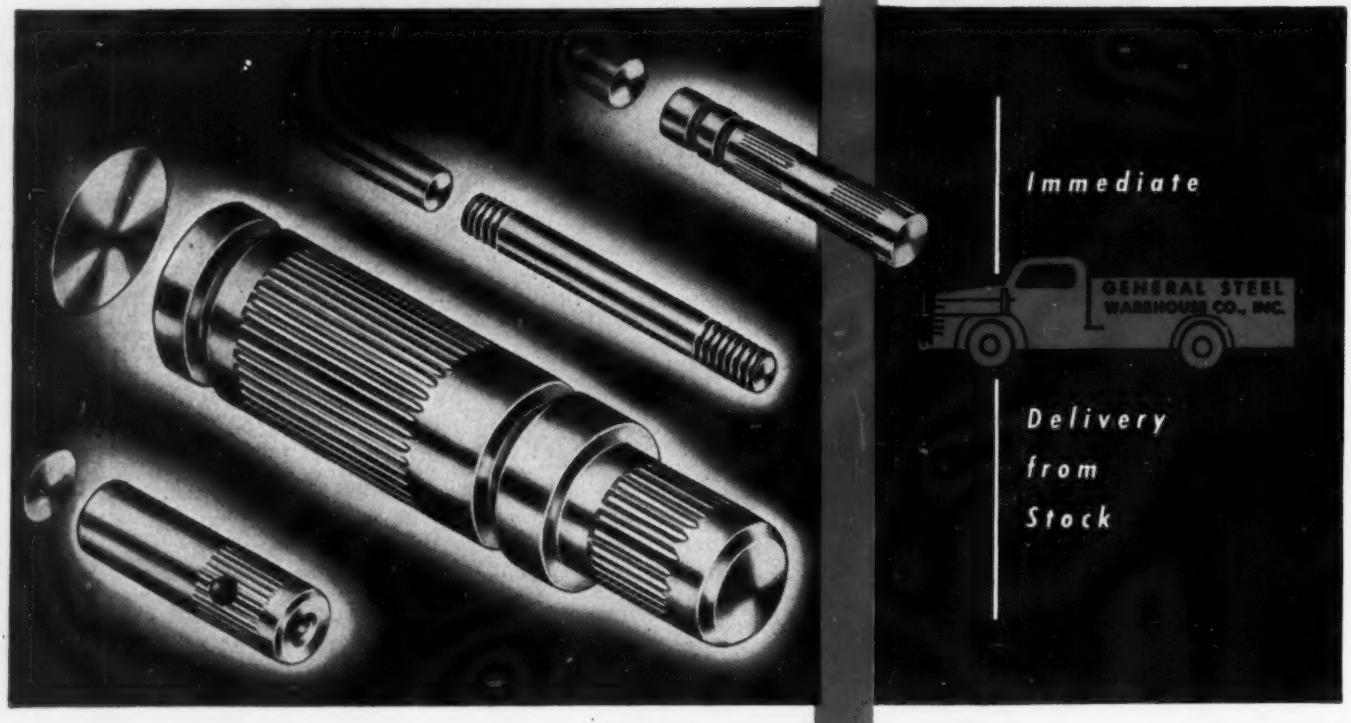
Sales Offices in all Principal Cities

For Improved Screw Machine Products

DRAWN, GROUND & POLISHED
B-1113 TOLERANCE ± .0005



GENSCO again offers a complete stock of drawn, ground and polished bars. This large stock from leading mills is as close as your telephone, available for immediate delivery, packed to your specifications and ready for your finest screw machine and general machine work. Gensco Sales Engineers are always available to assist you with your metalworking problems and selection of proper steels.

A SPECIALIZED STEEL SERVICE

As an added service General Steel Warehouse Co., Inc. will shear, slit, and edge your steel to exact specifications. This complete service, on the most modern equipment has aided many manufacturers in speeding up their production.

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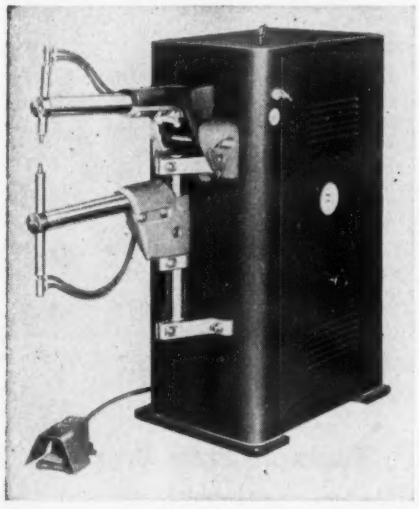
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Spot Welder

Eight ranges of heat selection, water cooled transformer and high conduction, high strength current carrying castings are features of the 50 kilovolt-ampere spot welders designed by Banner Products Co., 4965 North 29th St., Milwaukee 9, Wis. Model shown is made for foot or air



operation and used with either 220 or 440 volt, 60 cycle current. Thirty kilovolt-ampere models also are built.

On long production runs where repeat operation is used, the free action of welder and low inertia of rocker arm enable operator to space spots to produce a clean, uniform job. Machines have a 12, 24 or 36-inch throat and a stroke of 2½ inches. They are capable of welding 16 gage clean mild steel or light at a high production rate or heavier gage on lower duty.

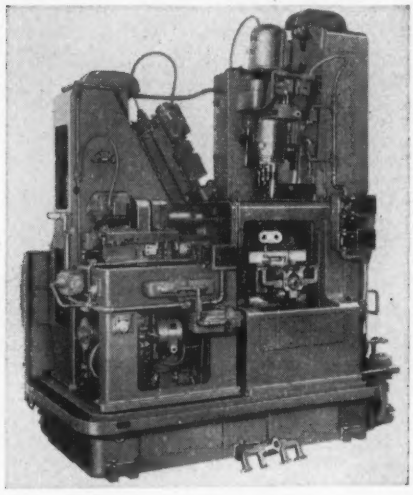
2. Photoelectric Control

Design for industrial applications such as counting, conveyor control, automatic paint spraying, break detection, sorting etc., the type 20DJ1 photoelectric control, introduced by Photoswitch Inc., 77 Broadway, Cambridge 42, Mass., is designed for high speed operation, its relay operating in 1/20 second.

Phototube and light source lamp are in small, dust tight, die cast housings, both wired to the control housing. Control is in a deep drawn sheet steel housing, tested to give unlimited life under conditions of high temperature and humidity. A tamper proof sensitivity adjustment permits operation over varying distances from control to light source and under conditions of ambient light. Maximum operating range is 10 feet. Operation is on current of 115 and 230 volts, 50/60 cycles, alternating current.

3. Five Operation Automatic

Five operations—drilling, spotfacing, chamfering, combination drilling and tapping—are performed on cast iron intake manifolds by the special automatic machine announced by



Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7, Mich. The machine, with a production rate of 160 pieces per hour at 80 per cent rated efficiency, employs high speed steel tools, operating in Snyder hydraulic units, powered with individual motors.

All operations except loading are automatic. Hydraulic work units are mounted on an automatic Geneva index table with four stations. As work piece is cast iron, no coolant is required. Stub tooth 20 degree pressure-angle gears in the heads provide adequate strength for trouble-free operation.

4. Index Tables

Electric powered, geared and hand operated index tables in diameters up to 48 inches are being offered by Buhr Machine Tool Co., 848 Green St., Ann Arbor, Mich. Fast, shockless, accurate indexing is provided with power being transmitted through a worm and worm gear to a roller type cam track. Table load is carried on ball bearings in a hardened race and is centralized by a heavy ball bearing spindle.

Operation of table may be in either vertical or horizontal plane. Its surface is scraped to extreme accuracy. Operating motor may be placed at front or rear, depending upon table installation. Production is in seven diameters from 10 to 48 inches.

5. Pallet Rack

Of all metal construction, a single face pallet rack and nesting ring for use with power or hand truck is announced by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich. Nesting ring may be permanently welded to pallet, if specified. Unit

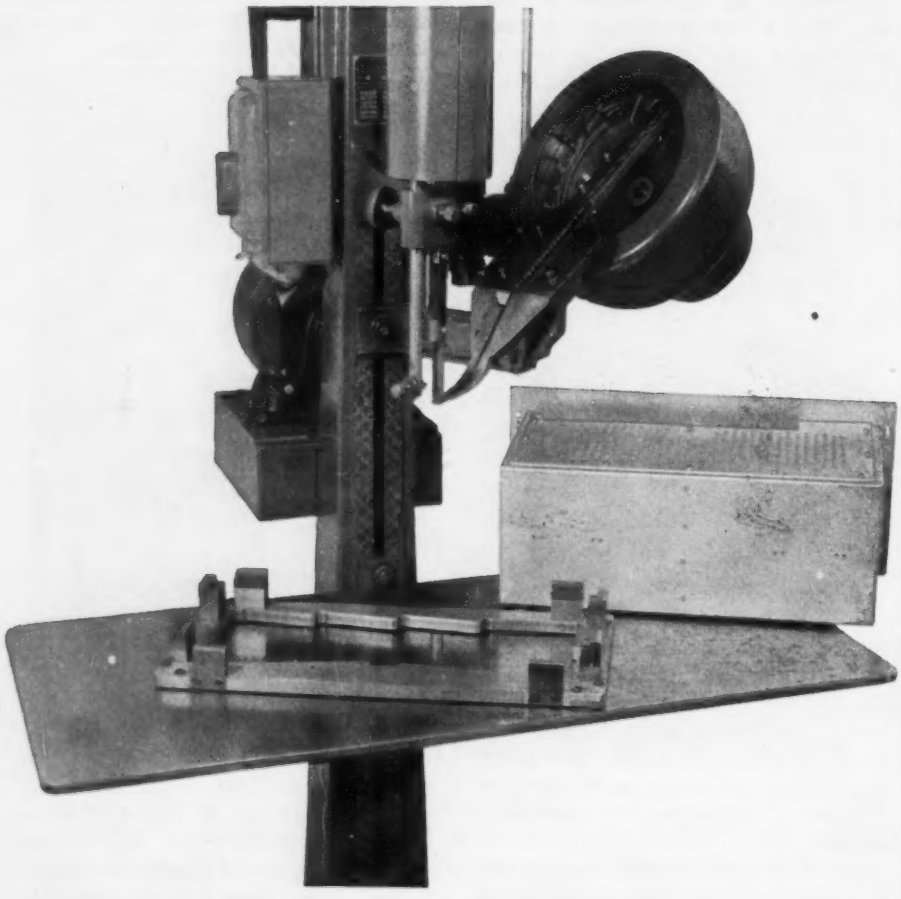
is designed for heavy industrial use and may be built to suit specific requirements or load specifications.

Pallet rack is of rolled channel steel with reinforced, all welded channel support for excessively heavy loads. Steel legs provide adequate height to permit accessability from all sides.

6. Displacement Pump

With its rotor assembly suspended within the pump body on a horizontal drive shaft that freely turns in antifriction bearing mounts, the new rotary, positive displacement pump, announced by Hydraulics Division of Rockwell Mfg. Co., 50 Water St., Pittsburgh 22, Pa., is of fixed volume, double acting type. Rotor carries four impeller vanes, geared together in a ratio of 2 to 1. As rotor is turned by applied torque, vane position varies with respect to side-

SELF-TAPPING SCREWS
• NO PROBLEM •
with
DETROIT POWER SCREWDRIVERS



Driving self-tapping screws presents a problem which is easily overcome by the use of Detroit Power Screwdrivers. Ten screws on each side of cabinet, as illustrated, are driven by the assistance of fixture mounted on steel balls, providing for ease of locating screw holes by means of a pin in center of table aligned with the fingers on the machine. This affords an easy way for the operator to slide the complete assembly from notch to notch in the fixture.

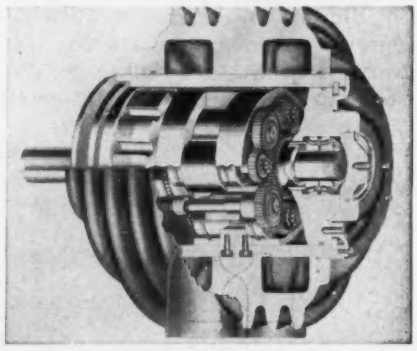
Screw-driving time per screw one second. Complete assembly is made in 55 seconds.

Send Sample Assemblies for Estimates and Catalog

DETROIT POWER SCREWDRIVER CO. 2811 W. Fort Street DETROIT 16, MICH.

walls of the circular pumping chamber.

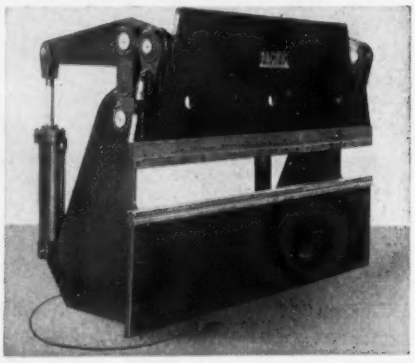
Liquid being pumped, in conjunction with the controlled clearances, provides capillary sealing between the high and low pressure areas in the working chamber. Since rotor assembly is symmetrical, it is in dy-



namic balance at all times. Operation is without pulsation in either direction. Operating efficiency is between 85 and 90 per cent, depending upon fluid handled and working pressure.

7. Hydraulic Press Brake

Capable of handling sheet metal and light plate forming operations on material sizes up to 1/4-inch by 10 feet, a new hydraulic press brake, known as model 150 by its manufacturer, Pacific Industrial Mfg. Co., 848 49th St., Oakland 1, Calif., has

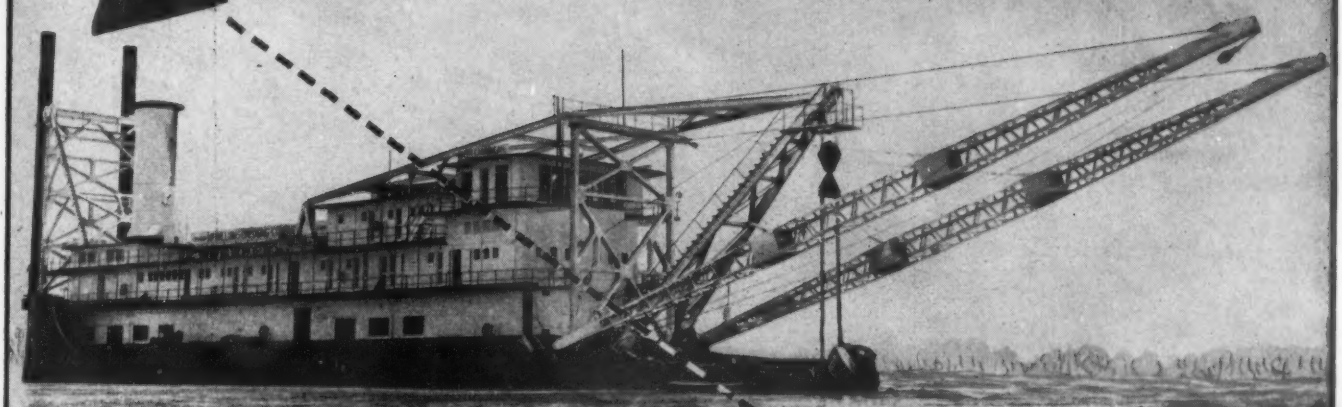


an overall die surface length of 12 feet, throat depth on standard models of 8 inches and clear distance between housings of 10 feet 2 inches.

Hydraulic operation provides an infinitely variable stroke length. Maximum pressure may be obtained at any point in the stroke and ram may be stopped, returned or restarted with full pressure at any point. Its low pressure system is powered by a rotary pump contained in the unit. Automatic controls maintain the ram at level or any tilt position with plus or minus 0.0025-inch. Ram movement is controlled by a foot switch. Vernier type gage stops and micro-

AVONDALE BUILDS...

2 GIANT DREDGES



FOR THE MC WILLIAMS DREDGING COMPANY

1 CARIBBEAN
2 CHICAGO

1. The Carribean was commissioned in July, 1947. She has dredged more than two million cubic yards in the Intracostal Canal between Corpus Christi and Brownsville, Texas.
2. The Chicago has been completed at AVONDALE and will be put to work at once.

Consult AVONDALE on your construction problems.

AVONDALE MARINE WAYS, INC.

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ELWELL-PARKER PAPER LIFT TRUCK

DEPENDABLE POWER

EXIDE-IRONCLAD POWER AND BATTERY ELECTRIC TRUCKS

The efficient, cost-cutting team that speeds materials handling

You gain all along the line when your materials are handled by electric trucks and Exide-Ironclad Battery Power. This modern efficiency team keeps goods moving in greater volume, and saves time and money all day long.

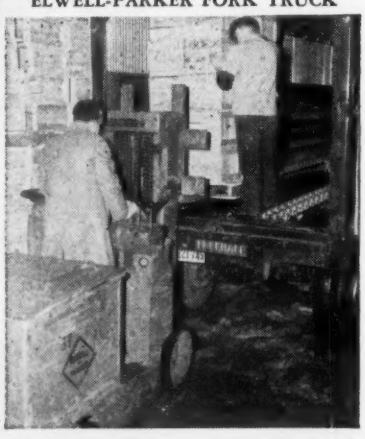
Exide-Ironclad Batteries are preferred for electric truck service because of their great power and dependability . . . a result of special Exide-Ironclad construction, which is unlike that of any other battery.

One important Exide-Ironclad feature is the positive plate which consists of slotted tubes containing the active material. So tiny are these slots that, while permitting easy access of the electrolyte, they prevent the active material from readily washing away. The results are high power ability, longer life, greater economy and safety.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of material handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

ELWELL-PARKER FORK TRUCK



switch controls are used to adjust stroke length.

8. Special Service Truck

Designed for the installation of a crane or winch and other special equipment, a special service truck, manufactured by Milford Crane & Machine Co., 143 Buckingham Ave., Milford, Conn., has two rear axles for adequate load carrying capacity. It is steered through all four of its front wheels, its front end suspen-

sion consisting of two axles so sprung that the load is equally distributed between the two.

The dual-service cab of the eight-wheel truck is designed for efficient and comfortable operation of equipment mounted on it. Controls for special equipment are centralized in the rear compartment of the cab. The driver turns around with his seat, facing the work. Large windows provide good vision. Truck is manufactured in capacities—33,000 and 48,000 pounds gvw.

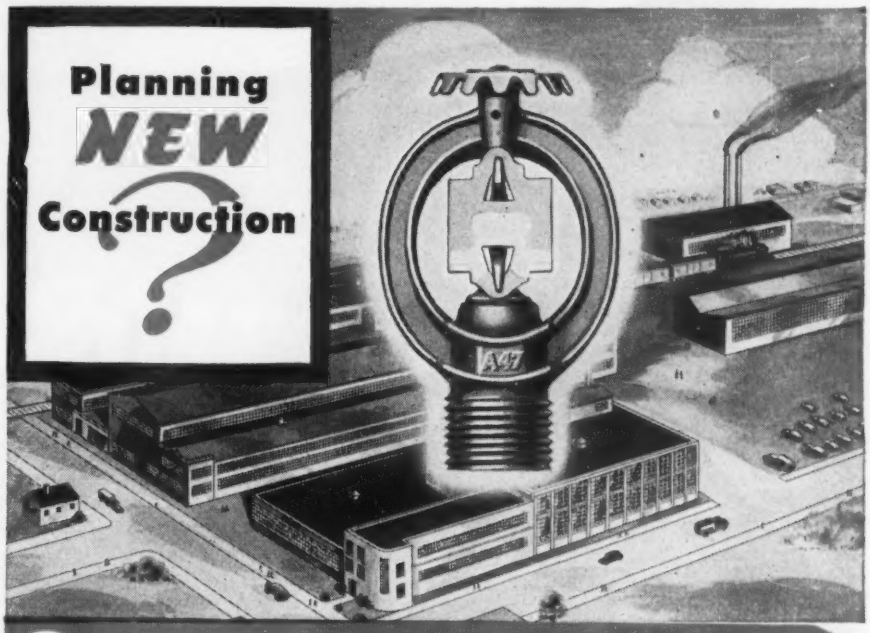
9. Temperature Regulator

Development of an accurate, low-cost self-acting temperature regulator designated as class T, is disclosed by Leslie Co., 154 Delafield Ave., Lyndhurst, N. J. Features include single seated construction in all sizes (½ to 4 inches) for steam pressures up to 125 pounds per square inch, packless main valve stem, hard faced seating surface, hardened wearing parts and liquid filled thermostatic element. It is suitable for operation with temperatures to 450°F.

10. Variable Speed Drive

An alternating current motor having infinitely adjustable speed, the Ajusto-Spede, made by Louis Allis Co., Milwaukee 7, Wis., provides variable speed output with a constant torque characteristic through a new eddy current principle. It operates directly from a 2 or 3 phase alternating current line and is suited for operation of metal slitters, conveyors and other variable speed machinery requiring constant torque input throughout its operating range.

Continuous duty speed ranges as



PrePLAN your fire protection

"Automatic" FIRE-FOG
• IT BLANKETS • IT ISOLATES • IT QUENCHES •

— a famous member of the "Automatic" Sprinkler Family. Provides adequate protection for quench tank, transformer, oil line and other fires of flammable liquid origin.

IF you're planning new construction or the remodeling of your existing facilities, adequate defense against fire must receive primary consideration. For the very structure of business enterprise is dependent upon continuity, and *fire can destroy that continuity with deliberate suddenness*

Today's business executives are aware more than ever before of the wisdom of safeguarding lives and property. They, too, are quick to recognize the advantages of "Automatic" Sprinkler protection, industry's most effective weapon against fire . . . and this recognition did not come overnight. It is the result of more than half a century of pioneering and leadership in the design, engineering, and construction of approved fire extinguishing devices and systems which *must* and *do* meet the approval of all leading fire insurance bureaus.

• Want further information on automatic sprinkler protection? Your telephone will quickly reach an "Automatic" Sprinkler Engineer located in the principal cities of North and South America, or write "Automatic" Sprinkler Corporation of America, Youngstown 1, Ohio.

"Automatic" Sprinkler devices and systems are listed by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories.

FIRE PROTECTION
DEVELOPMENT ENGINEERING
"Automatic" Sprinkler
MANUFACTURE INSTALLATION
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

116% MORE POWER PER POUND . . .

Up to 134% more starting torque per pound of motor . . . with as much as 116% more maximum torque per pound! As much as one third smaller . . . yet stronger mechanically AND electrically than any previous Westinghouse induction motor!

That's the achievement represented in the Westinghouse Life-Line—the biggest single advance in fundamental motor design in 58 years.

It wraps up in one solid steel-encased package, user preferences formerly obtainable only as custom-built features, if at all.

It makes available to industry, in a standard line of motors, improvements perfected for special wartime requirements.

Life-Line Motors are now in production at the new Buffalo Westinghouse Motor Plant, in frame sizes representing the popular demand of induction motor ratings. Check your nearest Westinghouse office for availability, or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

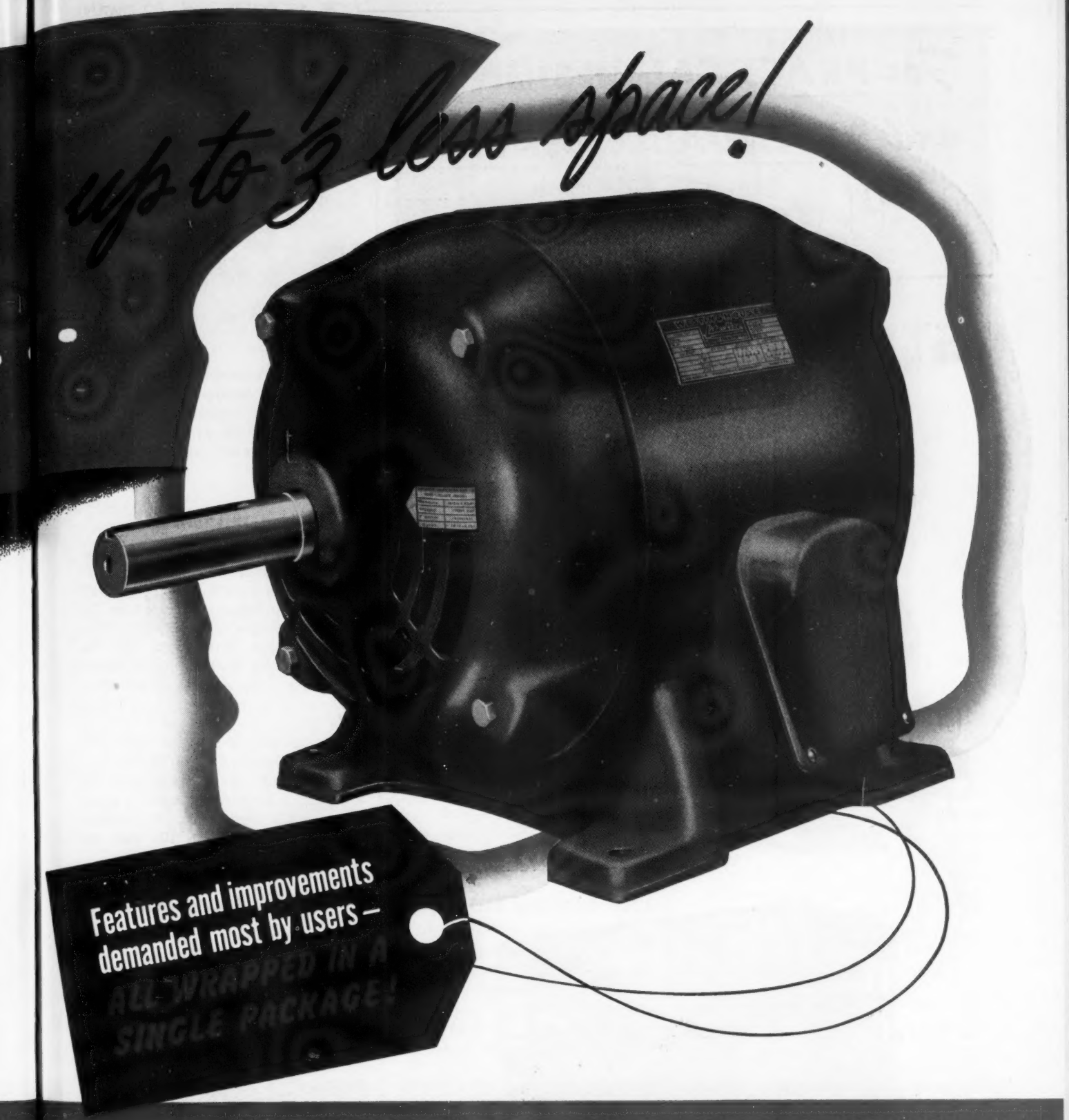
J-21408

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

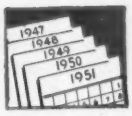
Life-Line motors

up to ⅓ less space!



ALL-STEEL PROTECTION

All frames, feet and brackets are HEAVY STEEL. Stators are far stronger... new core locking device eliminates rivets.



NO LUBRICATION FOR 5 YEARS

No greasing is needed for AT LEAST FIVE YEARS. Bearings are pre-lubricated... sealed against dirt and moisture.

NEW QUIET SMOOTHNESS

Life-Lines cut vibration and noise to new low limits for standard motors... satisfy many "special motor" needs.

LESS SPACE PER HP

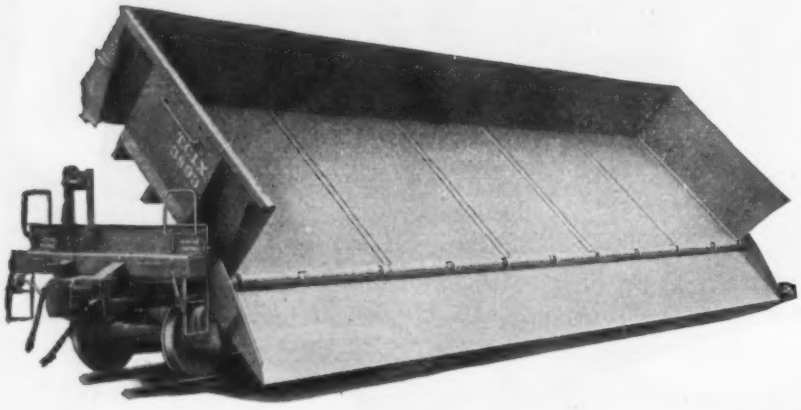
Life-Line Motors occupy less space per hp than any other standard motor... are easier to build into machines and install in cramped quarters.

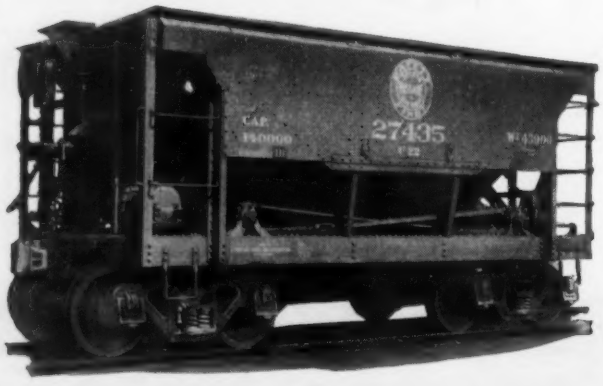
IMPROVED WINDINGS

New insulating materials... coil winding techniques ... stator slot designs... give new record-setting protection against electrical failures.

NEW SLEEK LINES

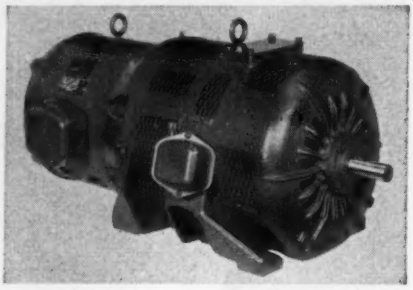
The Life-Line has sleek lines ... a smooth finish... discourages dust and dirt accumulations... harmonizes with modern machine and tool design.





PRESSED STEEL CAR COMPANY, INC.
PITTSBURGH, PA.
NEW YORK · CHICAGO · ST. LOUIS · ST. PAUL
MT. VERNON CAR MANUFACTURING DIVISION
Pressed Steel Car Company, Inc.
MT. VERNON, ILLINOIS

high as 10 to 1 are possible in the smaller sizes. Intermittent duty speed range is infinite in all sizes. In the sizes up to 75 horsepower, the two units—conventional squirrel cage induction motor and eddy current



clutch—are combined in one unit. Larger units incorporate separately mounted and coupled motor and clutch. Electronic excitation cabinet and speed control station are included.

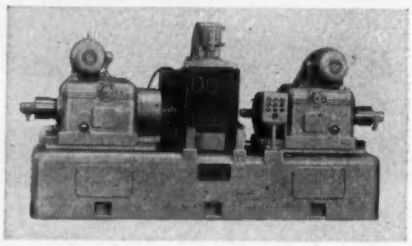
11. Machinery Lubricator

Fast lubrication of industrial machinery, automotive vehicles and other equipment is possible with the high pressure lubricator announced by Industrial Machine & Supply Co., Empire Building, Pittsburgh 22, Pa. Known as the SL-104 chassis lubricator, it is equipped with an air operated double acting pump which builds up a 50 to 1 pressure ratio. Grease flow is constant, making it impossible for air pockets to form in the line.

Piston and cylinder are built of a hardened alloy which assures maximum wear resistance. Lubricator may be used with 25, 100 and 400 pound original refinery drums.

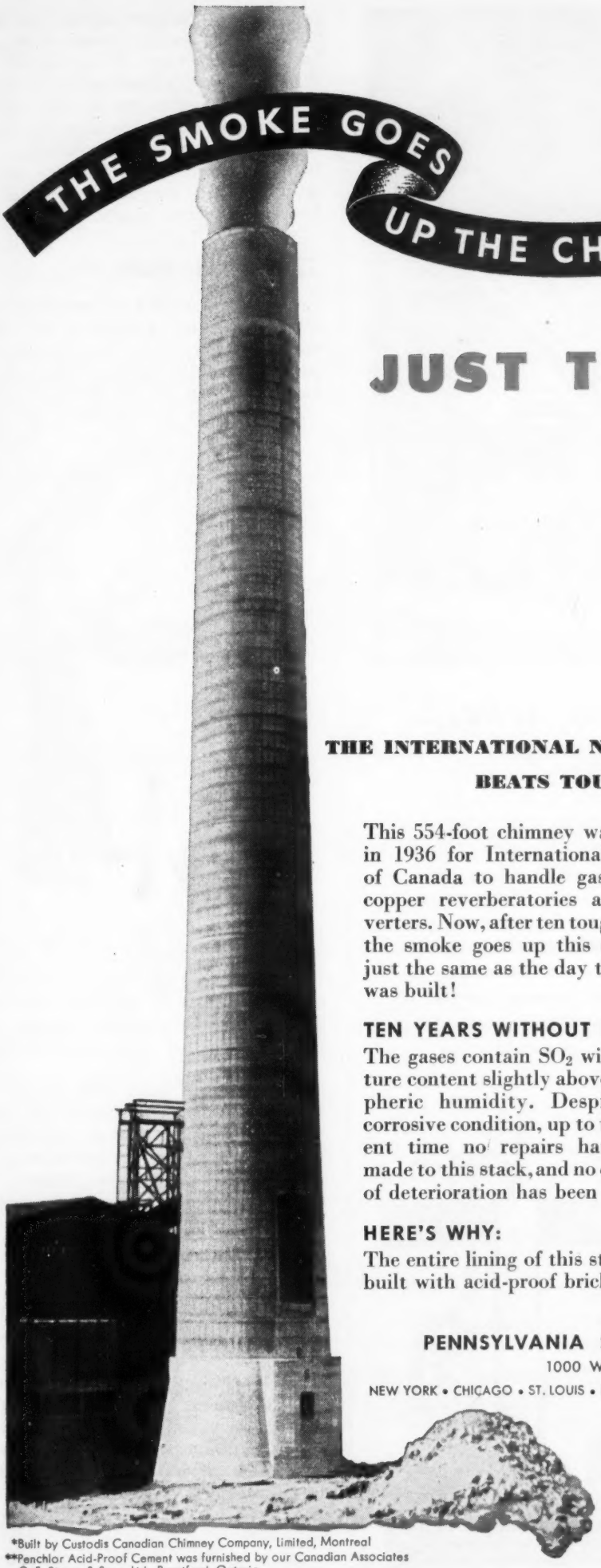
12. Straddle Facing Machine

Utilizing carbide tipped tool bits, two of which are mounted in each tool holder, a new type machine tool for facing main bearings on diesel



engine cylinder blocks is a development of Cross Co., Detroit 7, Mich. In operation, heads rapidly advance into cutting position, then the revolving bars carrying the tools feed out at 0.012-inch per revolution for the roughing cut and feed back again at 0.006-inch per revolution for finishing.

Parts are located and clamped by



JUST THE SAME!

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED

BEATS TOUGH CORROSION CONDITION

This 554-foot chimney was built* in 1936 for International Nickel of Canada to handle gases from copper reverberatories and converters. Now, after ten tough years, the smoke goes up this chimney just the same as the day the stack was built!

TEN YEARS WITHOUT REPAIR

The gases contain SO_2 with moisture content slightly above atmospheric humidity. Despite this corrosive condition, up to the present time no repairs have been made to this stack, and no evidence of deterioration has been noticed.

HERE'S WHY:

The entire lining of this stack was built with acid-proof brick laid in Penchlor Acid-Proof Cement.** In addition the top fifty feet of this stack was further protected by using Penchlor Acid-Proof Cement for pointing the outside surface joints. Penchlor Acid-Proof Cement is a superior sodium silicate cement that is quick-setting and self-hardening. Its outstanding record of satisfactory service has been proved in chemical plants, steel mills, paper and pulp mills, oil refineries and smelting plants.

SEND FOR CASE REPORT

If you have a corrosion problem, you'll be interested in further details about this Penchlor installation, as well as an illustrated brochure on Penchlor. Write for Case Report Number 62-2.

Special Chemicals Division

PENNSYLVANIA SALT MANUFACTURING COMPANY

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PENN SALT

CHEMICALS

97 Years' Service to Industry

*Built by Custodis Canadian Chimney Company, Limited, Montreal

**Penchlor Acid-Proof Cement was furnished by our Canadian Associates G. F. Sterne & Sons, Ltd., Brantford, Ontario

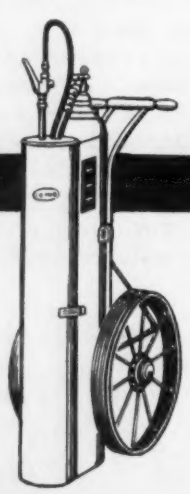
fast fire protection on wheels!

There are probably areas in your plant, remote from each other, which require more than ordinary fire protection: baking and drying ovens, dip tanks, pump houses, solvent baths, spray rooms, transformers, circuit breakers and other electric apparatus.

Large volume, highly mobile C-O-Two Wheeled Portables are especially designed for big, widely scattered hazards. They bring powerful fire protection on the spot in a hurry. Equipped with our famous Squeez-Grip release, C-O-Two Wheeled Portables blanket fire with clouds of dry, non-damaging carbon dioxide gas-and-snow, expanded 450 times its liquid volume. Seconds later the fire's out, and C-O-Two disappears without a trace.

C-O-Two is a modern fire fighter. It's fast, safe, non-conducting, non-corrosive, harmless to equipment and materials.

Our expert engineers will help you plan complete C-O-Two fire protection for your property. Write us today for your free catalog.



The C-O-Two Wheeled Portable is again available equipped with or without metal protective covers for horn and hose, and with steel wheels or rubber tires.

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1, N. J.

Sales and Service in the Principal Cities of U. S. and Canada
AFFILIATED WITH PYRENE MANUFACTURING COMPANY

power, then machined automatically. The operator simply presses control buttons. Advantages of machine are: Tool cost and maintenance are minimized, setup time is shorter and life span of cutting tools is longer. A better finish is produced as are parallel faces, square to the main bearing bores. Production is 41 cylinder blocks net hourly.

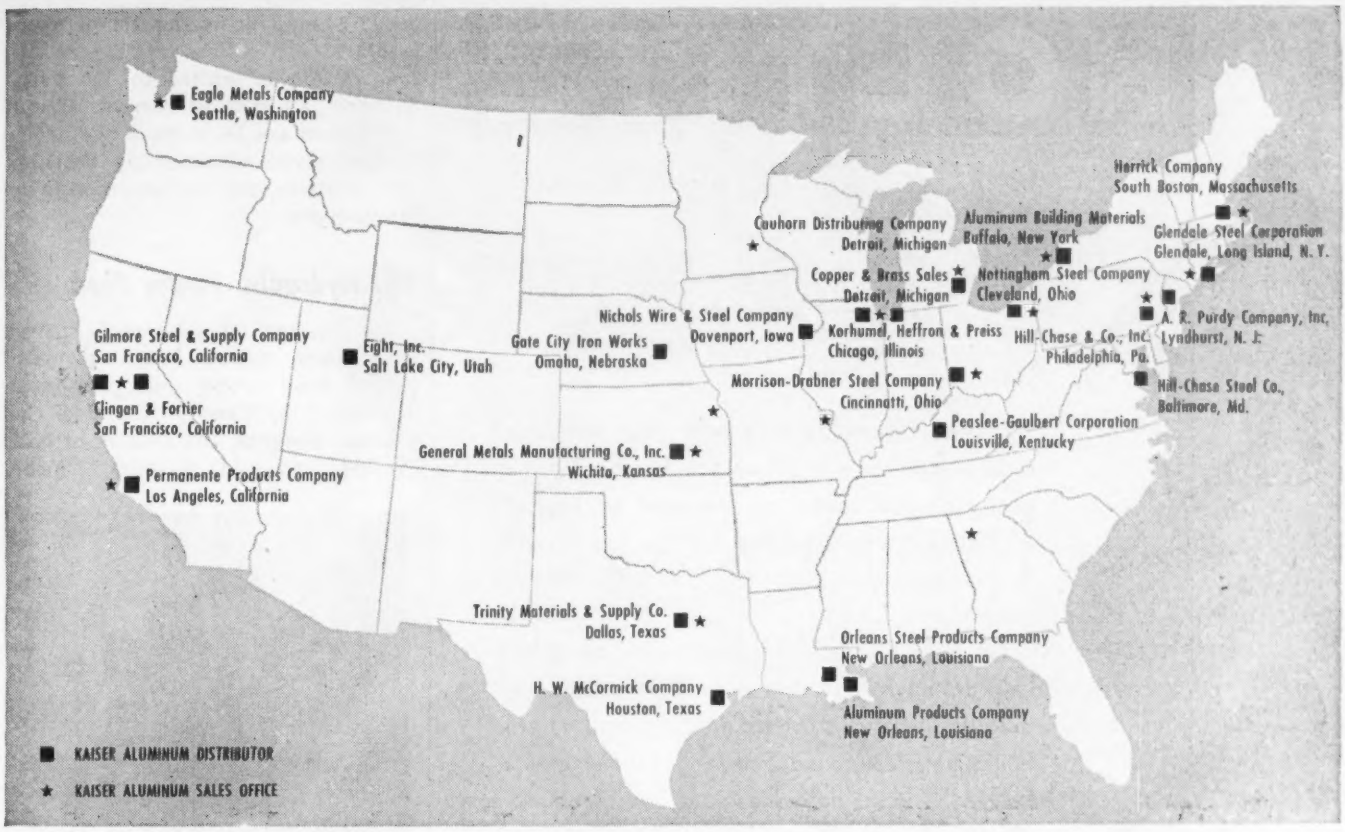
13. Polishing Lathe

Polishing and finishing of stainless steel, copper and aluminum may be carried out on the type NA2B-V speed lathe with vacuum type holding fixtures, made by Schauer Machine Co., 2081 Reading Rd., Cincinnati 2, O. With this machine, the part is revolved, instead of bringing it up to a revolving wheel. Various types and sizes of vacuum holding fixtures may be provided, depending upon the size and shape of materials to be finished.

Although the part may be very thin, fixture will not mar or distort the part. Machine may be equipped for either hand or foot operation of motor and brake control. Brake is applied when motor current is shut off.

14. Microscope Lamp

Cool light of high intensity and uniform field is obtainable from the twin 4-watt fluorescent lamps designed by Stocker & Yale, 48 Birch St., Marblehead, Mass. to straddle microscope objective lenses. Halos and highlights are eliminated by length and separation of bulbs and by nature of the light. A light intensity of 450 foot-candles at a 3-inch working distance and a color temperature of 3500° Kelvin are pro-



Here are your new supply points for Kaiser Aluminum

23 CONVENIENTLY LOCATED DISTRIBUTORS OFFER KAISER ALUMINUM SHEET, PLATE, STRIP, COIL, CIRCLES, ROOFING AND SIDING . . . IN LESS THAN CARLOAD LOTS

Now you can be certain of a close-up source of Kaiser Aluminum . . . *wherever you are located.*

Permanente Products Company is proud to announce the appointment of 23 of the finest material supply houses in the country as distributors of Kaiser Aluminum.

Your local distributor offers complete warehouse stocks of Kaiser Aluminum to meet your immediate needs. No longer need you wait for small carry-over stocks . . . for your local distributor sells in less than carload lots!

This new nationwide network of distributors is in addition, of course, to Permanente Products' 19 sales offices, each ready to help you in solving your engineering problems.

Which means that Permanente Products . . . in only a little over a year of operation . . . now completely rounds out its service facilities . . . to bring you more and better aluminum—*faster!*

Ready to serve you—today . . . 23 conveniently located

Kaiser Aluminum Distributors

PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND 12, CALIFORNIA . . . WITH OFFICES IN:

Seattle • Oakland • Los Angeles • Dallas • Wichita • Kansas City • St. Louis • Atlanta • Minneapolis • Milwaukee • Chicago
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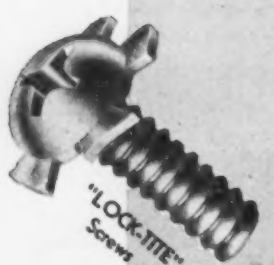
HOLTITE

Industry's Dependable Source For Every Type Of Fastening



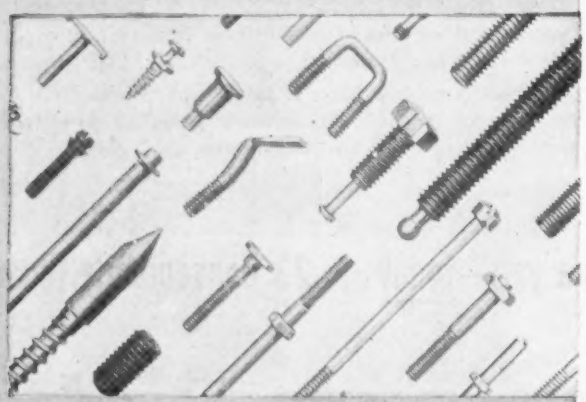
However complex or simple your fastening requirements may be, they can be met by the comprehensive range of standard or special HOLTITE items produced by the Continental Screw Company.

For over 43 years this progressive plant has kept step with the advance of American industry—meeting its current needs as well as anticipating its future requirements. In the extensive HOLTITE plant skilled engineering talent supplements completely modern equipment, Chemical and Metallurgical Research Laboratories, and every modern scientific inspection and testing device. In short, we are equipped with the most capable men, methods and machinery to provide a dependable source for every type of modern fastening. Specify HOLTITE for efficient, economical application in every assembly.

SPECIALS

Frequently, a special fastening or part designed for a particular purpose will replace several standard fastenings or parts and effect definite savings in labor and material costs.

We have complete facilities for producing specials exact to your specifications, blue prints or samples.



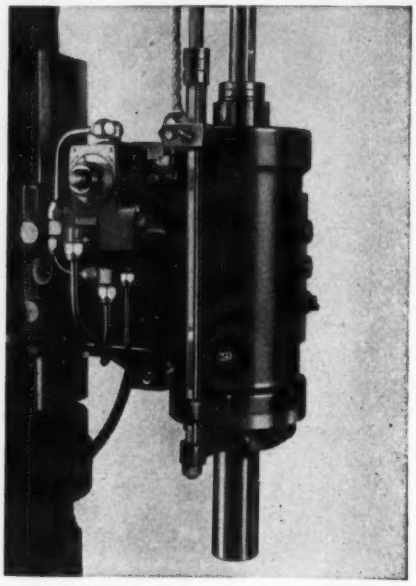
CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.

duced. Lamp operating temperature is 115°F.

Operation is limited to 115 volts, 60 cycle alternating current. Lamp dimensions are 1⅜ x 2¾ x 6¼-inches. Several styles of attaching brackets are available for various models of microscopes.

15. Hydraulic Power Feed

Development of a hydraulic power feed which makes fully automatic sliding head model drill presses, is announced by Canedy-Otto Mfg. Co., Chicago Heights, Ill., makers of both machine and feed. Feature is incorporated in all new machines and is available for attachment to existing models.



Hydraulic power feed may be operated automatically, semiautomatically or manually. It has provision for obtaining various rates of feed. Units equipped with the feed may be used for honing, lapping, tapping and drilling operations. In the automatic position, the unit provides reciprocating action to the spindle.

16. Chain Conveyor

Designed and built by Island Equipment Corp., 101 Park Ave., New York 17, is a conveyor that is either self-contained or may be used in conjunction with other systems, depending upon the particular requirements. Conveyor links provide a broad, flat carrying surface, sides of which are smooth and flat to minimize wear on side guides on corner turns. Links are of cast alloy steel.

A saving in chain may be obtained through application of ultimate double-flex chain or merry-go-round system in which no return chain or tracks are needed. A complete loop

...to Produce Greater Tonnages at Lower Cost!

You can depend on Birdsboro's Individualized Roll Service. That means Birdsboro Rolls are individually engineered to give you the specific combination of analyses and physicals to do its particular job best.

Whether your problem involves ferrous or non-ferrous metals and regardless of the degree of toughness or hardness required, Birdsboro Rolls assure you of greater tonnages, more accuracy, longer uninterrupted production and less replacement cost. On any roll problem, consult Birdsboro engineers first.

BIRDSBORO Type Rolls

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BIRDSBORO "40"
BIRDSBORO "50"
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*CUROLOY
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GRAINLOY
SUPERLOY
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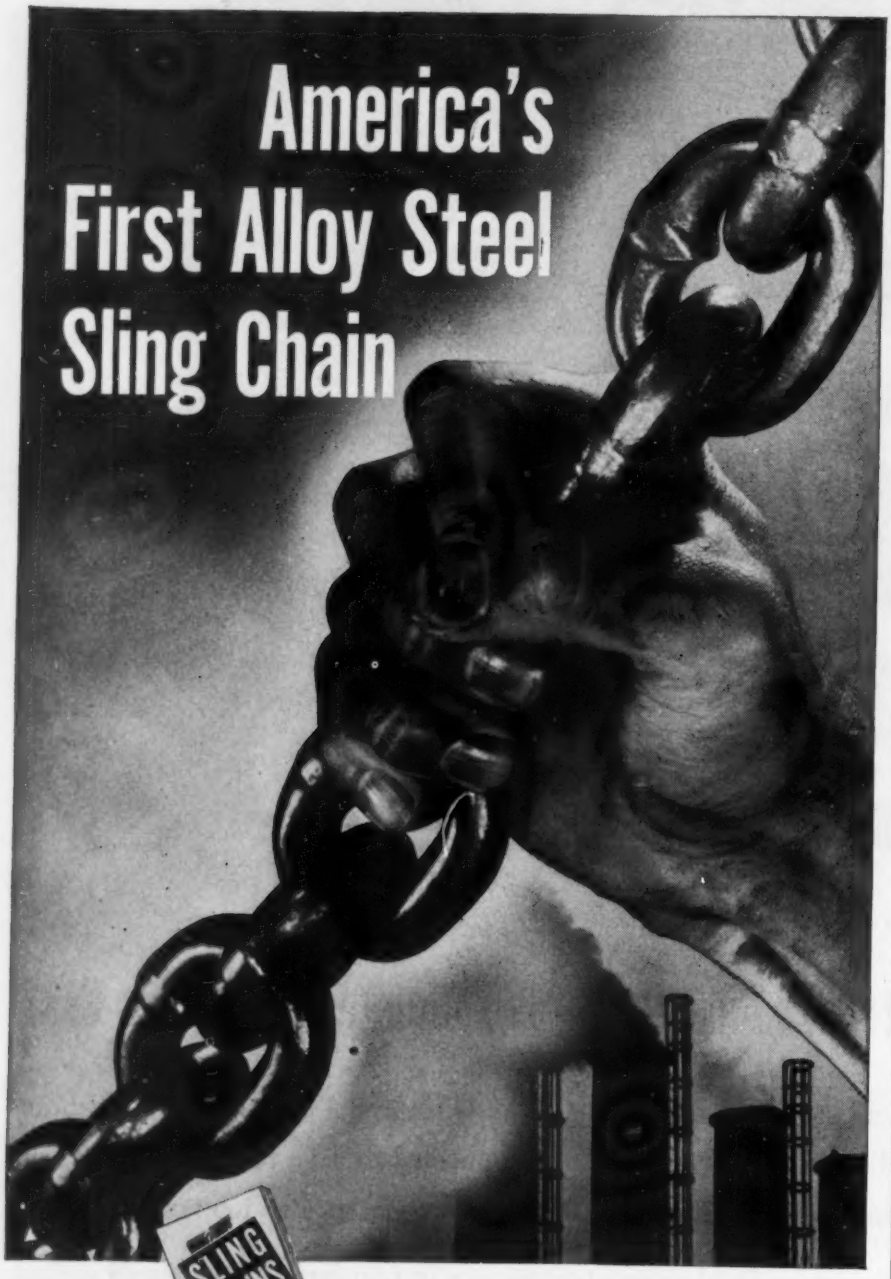
America's First Alloy Steel Sling Chain



Write for your copy of this new, informative booklet. No charge.

COLUMBUS-McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: NEW YORK, CHICAGO, CLEVELAND AND SAN FRANCISCO

"See us in Cleveland at Booth 526... Materials Handling Exposition January 12-16"

in any shape (oval, rectangular, offset, L, E, or F shaped) may be made. Only top carrying chain is needed with a loop at power unit and take-up unit in order to obtain driving power. Links may be quickly assembled and disconnected with pins.

17. Trestle Ladder

An aluminum trestle ladder of the type used for painting, cleaning, decorating, maintenance, etc., is announced by Aluminum Ladder Co., 200 Carbis St., Worthington, Pa. Made of 61ST aluminum alloy throughout, it may be used with others of the same type to support stages and platforms or it may be dissasembled to form two separate units.

Adjustable center piece ladder may be removed for use as a straight single wall ladder. Alloy used has a tensile strength of 45,000 pounds per square inch. Extended lengths of 10, 14 and 18 feet are offered, the 18 foot ladder weighing 55 pounds.

18. All Purpose Transformer

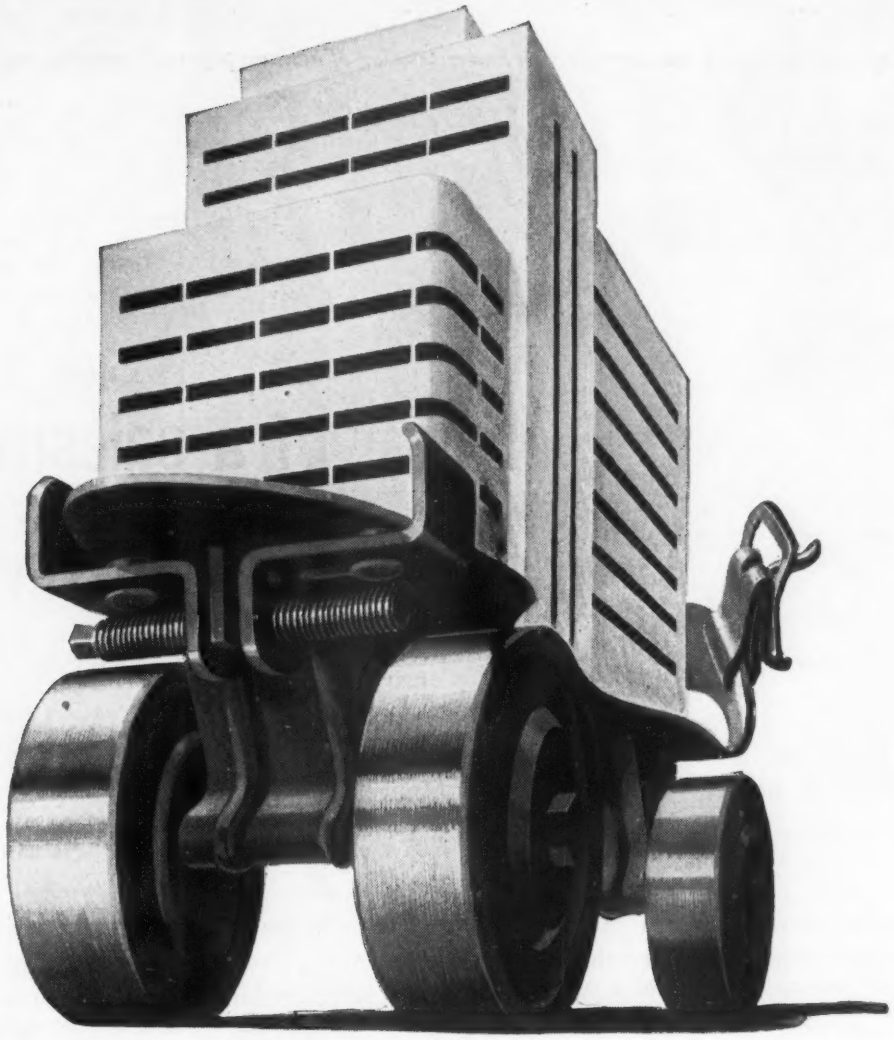
Impulse strength increased to 45 kilovolts as added protection against lightning and switching surges is a feature of the new type CT-2.5 current transformer, designed by Westinghouse Electric Corp., Pittsburgh 30, Pa., for both relay and meter work. It has class 0.3 accuracy with B-0.1, B-0.2 and B-0.5 burdens, highest standard recognized by American Standards Association.

Transformer is available for indoor use in the 2.5 kilovolt class of insulation for operation on circuits of 2890/5000 volts or less. It is produced in ratings from 10 to 800 amperes with full load secondary current of 5 amperes in all sizes. It uses a high permeability Hipersil core steel.

19. Laboratory Furnace

For continuous operation up to 2600°F and intermittent operation up to 2800°F, a new high temperature laboratory and pilot plant furnace has been developed by Boder Scientific Co., 719-721 Liberty Ave., Pittsburgh, Pa. Its working chamber measures 4½ x 6½ x 12 inches, high, wide and deep, respectively. It may be used as a box or muffle furnace, or with diamond blocks, for nonoxidizing neutral atmospheres at elevated temperatures.

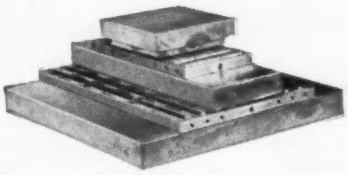
Furnace shell is insulated with 3000°F heavy brick backed up by magnesium block. Ten silicon carbide heating elements on top and bot-



Roller skates for a skyscraper...

to enable an addition atop a California building to "ride out" the shock of earthquakes smoothly and safely, 65 specially designed Roller Thrust Bearings were installed beneath it. This unusual application is

Another "special" by Torrington...



One of 65 Torrington Roller Thrust Bearings installed under three-story addition to a Los Angeles building.

who for years has been designing and manufacturing custom-built bearings for out-of-the-ordinary requirements. Examples include made-to-order bearings for movable bridges, sluice gates and huge cranes, for outsize equipment in steel mills, oil fields and paper mills.

We will gladly put our experience at your disposal in designing and building bearings to meet your most exacting anti-friction requirements, routine or unusual.

THE TORRINGTON COMPANY

SOUTH BEND 21, IND. TORRINGTON, CONN.

Offices in All Principal Cities

TORRINGTON BEARINGS

• NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL •

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your business.*

Ever hear of a salesman who knew how to sew?

SEEMS THERE WAS a young salesman who took a job with a company that makes electric blankets. He figured he could sell those blankets a lot better if he knew how to *make* one.

So he spent enough time in the factory to learn every step in their manufacture—cutting, wiring, sewing and all. The experience proved so valuable that today the company requires every salesman to *make* one of the blankets he sells.

That sounds like such a good idea that maybe it could work *both ways*. Let the *production man* learn something about how they sell what he makes. The result should be a better job in both departments, for producing and selling have one important thing in common. Both thrive on *mechanization*.

In the manufacture of a sale, for example, it usually takes five separate operations to find a prospect and convert him into a customer. To expect the salesman to perform all five would be like manufacturing the product itself entirely by hand—slow and far too costly.

So the salesman depends on a *machine* to take over part of his selling job. Finding prospects, arousing their interest, creating a preference for his company's product or service—all these operations must be *mechanized* if sales are to be manufactured at a profit.

Advertising is the machine that puts selling on a mass production basis. And in the business press—with its tremendous concentration of hand-picked readers—the machine operates at its *highest efficiency*.

Just how efficiently does business paper advertising work? If you'd like to see some examples, we'll be glad to send you a recent ABP folder on actual results. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.

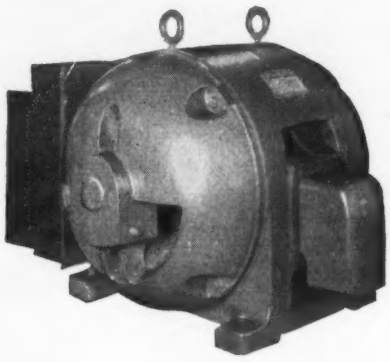
STEEL

is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.

tom distribute the heat. Electrically operated, the furnace has a variable voltage transformer of 8 kilowatt capacity and an automatic electronic controller pyrometer.

20. Power Supply

A power supply for high speed alternating current motors used on grinders and drills, the Tri-Clad type AKC inductor frequency converter, is being manufactured by General Electric Co., Schenectady 5, N. Y. This self-excited and self-driven machine,



which provides 3-phase power at frequencies from 360 to 2160 cycles, 1/2 to 150 kilowatts, consists of a cast rotor revolving in a stator having two windings.

Input winding is operated at standard line frequency and serves as a stator winding to drive the rotor as an induction motor, also supplying excitation for high frequency winding. The secondary winding is the generator winding, in which high frequency voltage is generated. Control for frequency converter usually consists of a magnetic switch with thermal overload on the input side. Full voltage starting is recommended.

21. Flexible Shaft Machine

Complete enclosure of the V-belt drive by a sliding ventilated pulley guard which may be raised to change speeds and a locking shaft holder which securely holds shaft and grinding wheel in fixed position for stationary grinding are features of the Streamflex flexible shaft machine made by Wyzenbeek & Staff Inc., 838 West Hubbard St., Chicago 22, Ill.

It is a 3-speed machine made in two speed ranges—1400-2400-4500 revolutions per minute and 1800-3600-7200 revolutions per minute. Uses may be vibrationless grinding, sanding, polishing or rotary file work on molds, patterns, dies or on stainless steel fabrication. Five models for both bench and floor operation are

18-8 STAINLESS...

Tried and True

TO anyone but a metallurgist, the nominal analysis of Circle Ⓛ 22XM (table at left) may not look much like an "18 and 8" alloy. And yet it is the legitimate offspring of this famous family of corrosion resistant alloys which have proved their worth in hard, practical service for a generation.

Improvements in analysis, in heat treating, and in modern foundry practice make it a practical material whenever corrosion cuts into operating profits or threatens product integrity.

Circle Ⓛ 22XM is one of several "18 and 8" Stainless Alloys which account for a high percentage of our electric induction furnace output. We will be glad to help select the right one for your purpose. Write for convenient reference chart.

LEBANON CIRCLE Ⓛ 22XM

NOMINAL ANALYSIS

Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	10.00
Molybdenum	2.25

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	82,000
Yield Point	42,000
Elongation in 2"—%	50
Brinell Hardness	160

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER SWISS CHAMOTTE) METHOD

LEBANON ALLOY AND STEEL Castings

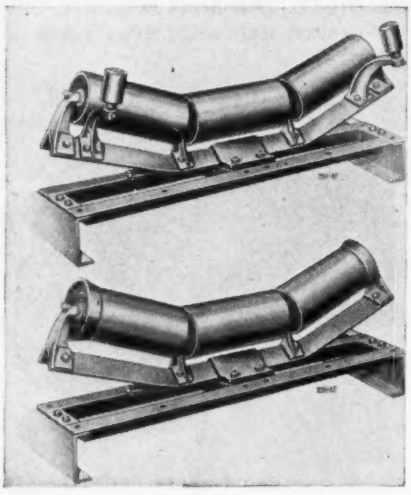
CIRCLE L

Sure Cure for Your
"WASTE LINE"
Coiled
Cleanout
Rod
by
Center
Spring
Company*
made of
KEYSTONE MUSIC SPRING WIRE
Coiled clean-out rods are subject to the most extreme twisting, bending, jerking and pulling. They will stand this abuse only because of the high uniform quality of the wire used.
Keystone Music Spring Wire has the structural soundness, high physical properties and uniformity necessary to this difficult coiling operation. It is the choice of the Center Spring Company. Not only does it simplify their production problems . . . but it is an assurance of high quality in their product.
*Center Spring Co., Center, Indiana
KEYSTONE
MUSIC SPRING WIRE
SPECIAL ANALYSIS WIRE
for all industrial purposes
KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

available, a 1/3 horsepower model in both speed ranges and a ½-horsepower model in the floor type machine only.

22. Belt Idlers

Self aligning troughing idlers which correct immediately the slightest misalignment of the belt, automatically, are announced by Jeffrey Mfg. Co., Columbus 16, O. The idlers,



intended for belt conveyor service, have ball bearing pivotal mounting at the center.

Arm type idler (top) is for use if there is a consistent tendency for an unusual amount of misalignment. The brake wheel type (bottom), with flared, adjustable friction type end rollers is adaptable to reversible belts. They can be furnished with either 5 or 6-inch diameter rollers for belt sizes from 14 to 48 inches in the arm type and from 18 to 48 inches in the brake wheel type.

23. Tool Post

Development of a tool post for engine lathes which permits an unlimited number of machining operations from one set-up is announced by A. K. Tool Co., 2029 Blake Ave., Los Angeles 26, Calif. Changing tools for different operations can be accomplished in a short time, making the post satisfactory for both production and nonproduction lathe work.

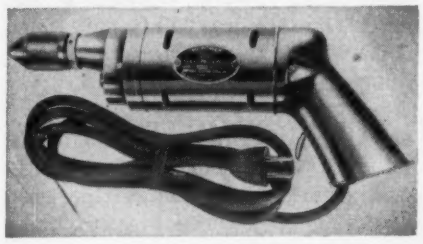
Tool post holds tool bits in a parallel position, making it adaptable for use with carbide tool bits. Tool overhang is cut to a minimum and tool height adjustment is fast and simple. Each tool holder is equipped with a "stop", making it independent of other tools in the set-up.

Made completely of cold finished steel and case hardened throughout, the tool posts are available in sizes

to fit lathes of 9 to 24 inch swing. Holders are produced in sizes to take tool bits from ¼ to 1¼-inches.

24. Electric Drill

Comfortable pistol grip handle with trigger switch control, air cooled alternating or direct current motor, lightweight stator housing of seamless aluminum tubing, screw on drill



chuck and oil retaining bronze bearing are features of the portable electric drill made by Portable Electric Tools Inc., 255-59 West 79th St., Chicago 20, Ill.

Known as model No. 77, it has no-load and full-load speeds of 1700 and 900 revolutions per minute, respectively. Capacity is a 1/4-inch drill in mild steel or hard wood. Drill is supplied with a 3-jaw, Brown & McLaren screw-on chuck, but a Jacobs Hand Tite chuck is available. Weighing 3½ pounds, it operates on 110 volts, with other voltages also available.

25. Cam Yoke Roller Bearing

Latest development in the Multirol full type roller bearing design originated by McGill Mfg. Co. Inc., Valparaiso, Ind., is the cam yoke roller bearing. This cam following type is built with an inner race to increase adaptability where mounting by other means is undesirable. Shaft sizes range from 0.250-inch for the CYR-¾ to 1.250 inch for the CYR-4.

Internal construction of bearing has an extra heavy outer race section and a full complement of small diameter rounded end rollers. Their full usable length provides maximum load carrying capacity which with roller end plates permanently secured to inner ring shoulders makes the unit capable of rugged service.

26. Portable Conveyor System

Termed the Unitized portable power conveyor system, a new materials handling system which can be set up and disassembled quickly to handle loads up to 100 pounds per square foot is a development of Food Machinery Corp., Riverside, Calif. System combines flexibility of portable conveyors

Photo — Courtesy Consolidated Vultee Aircraft Company

STANDARD CONVEYOR COMPANY is able, through long experience, to specify and build for a diversity of handling needs . . .

On your next conveyor need — large or small, a section, a system, a portable conveying or piling unit—check with Standard, builders of an unusually wide variety of conveying equipment: power and gravity conveyors in belt, roller, chain, slat and push-bar types, portable units, spiral chutes, pneumatic tube systems.

The range and versatility of Standard Conveyor equipment is the result of nearly 40 years of close contact with inside-the-plant transportation — in plants large and small, making products as widely diverse as steel or cosmetics. The benefit of this experience is available to you, without obligation.

The counsel of Standard Conveyor engineers is valuable in deciding on the right kind of conveying equipment to "Deliver the goods" faster—at lower cost. *Write for comprehensive reference book — "Conveyors by Standard" — Catalog No. ST-127.*

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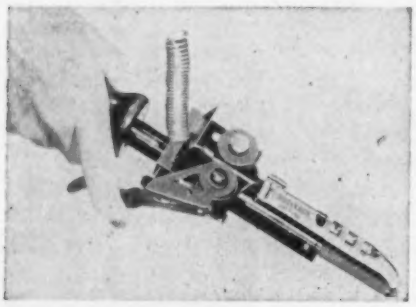
2ND MATERIALS HANDLING EXPOSITION
CLEVELAND JANUARY 12-16, 1948

with fixed conveyor systems.

Conveyor system is built around a basic power unit made up of a standard 10 foot straight section powered by a ½ horsepower slow-speed motor. This unit combines with various accessories and with the "accordion" gravity conveyor. Accessories such as 90 degree power turns, automatic power conveyor intersection, piling conveyor base, power feed attachment and gravity take-off attachment are offered.

27. Solder Feeder

Solder is fed smoothly at the touch of the fingertip, by an attachment which clamps on to any standard electric soldering iron, made by Nelpin Mfg. Co., 45-17 Davis St., Long Island City 1, N. Y. The device,



called the Solder-Matic, frees one hand to manipulate parts, pliers or screw driver while soldering.

By feeding the amount of solder needed at the right time and place, it also eliminates molten solder drippage and improves quality of workmanship. Operator can do a better job in crowded spots or in awkward positions. Solder in short lengths, small coils or in spools as large as 25 pounds can be handled. Diameters from 1/16 to 3/16-inch may be fed in strokes up to 3/16-inch.

DEVELOPED BY . . .

28. Tracerlab Inc., Boston, Mass., Duoscale plug in scale of two, a replaceable scaling circuit for radioactivity counting instruments and other scaling operations.

29. Celco Corp., New York 17, N. Y., Tank Kleen formula 101, a liquid fuel system cleaner made to dissolve and eliminate formations of gums, tars and other binders.

30. Airmatic Valve Inc., 1643 East 40th St., Cleveland, O., direct operated, solenoid high vacuum valve requiring no pilot or other medium for operation. It operates on 110 volt direct current.

31. Titeflex Inc., 531 Frelinghuysen Ave., Newark, N. J., flexible tubing with Inconel innercore and braid which will resist temperatures up to 1700° F.

32. All State Welding Alloys Co. Inc., White Plains, N. Y., No. 100 high strength and No. 111 lowest melting point silver brazing alloys, each offered in 10 and 20 foot lengths in a sealed package.

33. Geneva Metal Wheel Co., Geneva, O., molded-on solid rubber tired cast industrial wheels. Sizes range from 1½ x 4 to 5 x 20 inches and capacities from 140 to 2370 pounds.

34. United States Gauge Division of American Machine & Metals Inc., Sellersville, Pa., sealed case dial indicator pressure gage which shows pressure in inches or millimeters of mercury.

35. Manning, Maxwell & Moore Inc., Bridgeport 2, Conn., Microsen amplifier for measuring and amplifiying minute power impulses as low as 0.2 microvolts.

36. Continental Electric Co., Hawthorne, Calif., adjustable 3-phase winding head for faster, easier and more accurate winding of coils for all 3-phase electric motors from ⅛ to 40 horsepower.

37. Aeroil Products Co., West New York, N. J., two new indirectly heated, thermostatically controlled melting and dispensing tanks with indirectly heated dispensing valves.

38. Acme Tool Co., New York 7, N. Y., bench vise with entirely enclosed body. It has interchangeable and reversible jaws and is offered in sizes from 2 to 6 inches for light or heavy duty.

39. Ruthman Machinery Co., Cincinnati 2, O., model 11029 pump with totally enclosed motor and new style upper end bell with large built-in conduit box. Capacity at 26 foot head is 40 gallons per minute with a ½-horsepower motor.

40. Potter Instrument Co., Flushing, N. Y., model 450, 1.6 megacycle interval timer counter which will measure intervals in steps of 0.625-microsecond, up to 1 second.

41. Wales-Strippit Corp., North Tonawanda, N. Y., heavy duty type EJ hole punching unit, designed with a center projection to carry the die which makes possible simultaneous punching of a series of holes in angles, channels, etc.

42. North American Mfg. Co., Cleveland 5, O., a soft seat atmospheric regulator, known as series 18. It features tight shut off when demand for gas flow ceases.

43. Homestead Valve Mfg. Co., Coraopolis, Pa., utility model Hypressure Jenny steam cleaner, a full powered, extra heavy duty unit which features instant starting and non-clogging heating coil.

44. Automatic Products Co., Milwaukee 10, Wis., models 211 and 212 thermostatic expansion refrigeration valves for use where a pressure limiting feature is desirable to avoid motor overload difficulties.

45. J. A. Campbell Co., Long Beach 7, Calif., a portable straight line cutter used to cut metal plates with welding torches. Holder may be adjusted to cut bevel or scarf angle. Unit is 5 feet long.

46. Kennametal Inc., Latrobe, Pa., grade K138 cemented carbide composition which retains its strength and corrosion resistance at high temperatures. Heating to 2100° F or water quenching at 1800° F leave it unaffected.

47. Eco Engineering Co., Newark 1, N. J., new line of gearless pumps for general industrial use. Double impeller design gives strong flow against pressure. Various sizes and capacities for most liquids offered.

48. Size Control Co., Division of American Gage & Machine Co., Chicago, an automatic feed attachment for centerless lapping operations. Adjustable spring tension determines pressure to be applied to cylindrical pieces.

49. Finke Co., Brooklyn 20, N. Y., Conetrol diamond wheel dresser which sharpens itself and cone forms the diamond until fully consumed. Device has reciprocal action while dressing the wheel.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Buyers Concerned Over Future Supplies

Uncertainty as to government controls and effect of Marshall Plan on domestic supplies reflected by increased pressure on mills for tonnage. Stalemate in scrap continues but market undertone is strong

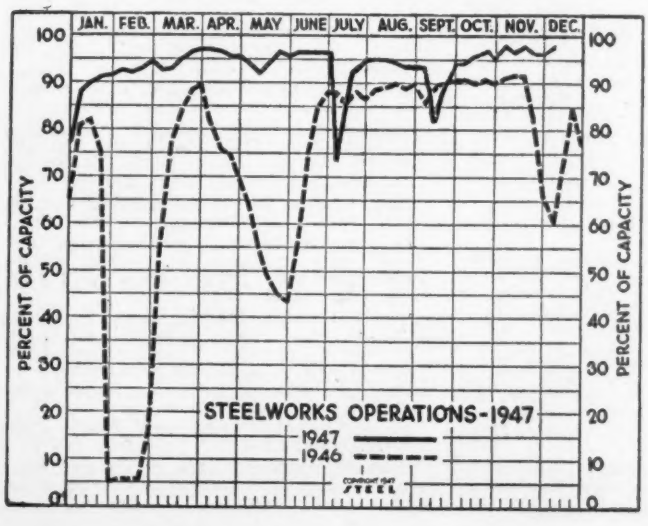
BROAD controls over domestic distribution of steel products are not likely to be granted the administration by Congress. Nevertheless, until government policy is definitely determined uncertainty and indecision are likely to prevail in the iron and steel markets.

PRESS FOR TONNAGE — Currently, consumers are showing increasing concern over future supplies. They are pressing for metal due them on contracts, at the same time exerting every effort to get additional tonnage on mill order books. This increased pressure reflects apprehension over the possibility of government allocations, as well as the effect of the Marshall Plan on domestic supplies.

EXPORT POLICY—Assurances from Washington have been to the effect direct exports of steel will be no heavier under the Marshall Plan than heretofore. Supporting these assurances was extension last week of steel export controls.

Under such control the government hopes to channel shipments more effectively to essential foreign needs, conserving steel for domestic use.

DISCOURAGE STOCKING—Steelmakers, loaded with more orders than they can handle expeditiously, are discouraging buyers in their drive for more tonnage, especially where a disposition is shown to build up stocks unduly. They are screening consumer requirements more carefully so that available supplies may be used most effectively for critical domestic requirements. In this connection it is reported allotments for the railroad car program soon will be increased to 250,000 tons monthly as against 210,000 tons at present.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Dec. 6	Change	Same Week 1946	Same Week 1945
Pittsburgh	102.5	+ 1.5	50	79
Chicago	95	None	75	90.5
Eastern Pa.	93.5	None	57	80
Youngstown	90	None	35	80
Wheeling	93.5	+ 7.5	82.5	95
Cleveland	90.5	— 3	92	86
Buffalo	88.5	None	51	88.5
Birmingham	103	None	45	95
New England	85	— 2	90	83
Cincinnati	87	None	84	67
St. Louis	87	+ 9	82.5	68
Detroit	92	None	90	89
Estimated national rate	97.5	+ 1	60.5	83.5

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

SUPPLY PROSPECTS—There is little chance supply conditions will ease in sheets, strip, plates, pipe and bars until well into the new year. First quarter consumer quotas have been set up but these are subject to revision. Some expansion in sheet rolling capacity is expected early next year but little relief in the tight supply situation is likely before midyear.

Pig iron is in critical supply, especially for the merchant trade. Foundry operations are seriously hampered by short stocks, and this despite recent record peacetime production.

PRICE SITUATION—No immediate major change in base prices on steel products appears likely, except on tin plate. However, continued rise in production costs and threat of further wage increase cast a cloud of uncertainty over the entire price setup. At the moment, the stalemate in scrap continues, but when steel producers resume large buying it is expected prices will immediately advance. Despite the current sluggish movement of scrap, the market displays a strong undertone.

OPERATIONS—Steel production rose 1 point last week to 97.5 per cent, highest since the week ended June 10, 1944. Last week's schedule was equivalent to output of 1,710,000 net tons of ingots and castings, highest tonnage rate in peacetime history and peak since the week ended May 19, 1945. Production in the first 11 months of this year totaled about 77,500,000 tons, peacetime record.

Production rose 9 points last week in St. Louis to 87 per cent, 7½ points in Wheeling to 93.5, and 1½ points to 102.5 in Pittsburgh. Operations were 3 points lower in Cleveland at 90.5 and 2 points lower in New England at 85 per cent.

COMPOSITES—STEEL's composite price averages held unchanged at $76.09 for finished steel, $57.20 for semifinished, and $40.42 for steelmaking scrap. The composite for steelmaking pig iron eased to $36.31 from $36.42.

COMPOSITE MARKET AVERAGES

	Dec. 6	Nov. 29	Nov. 22	One Month Ago Nov., 1947	Three Months Ago Sept., 1947	One Year Ago Dec., 1946	Five Years Ago Dec., 1942
Finished Steel	$76.09	$76.09	$76.09	$76.09	$75.41	$64.75	$56.73
Semifinished Steel	57.20	57.20	57.20	57.20	56.80	41.10	36.00
Steelmaking Pig Iron	36.31	36.42	36.42	36.38	36.14	29.10	23.00
Steelmaking Scrap	40.42	40.42	40.42	40.42	37.83	27.69	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, rails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Dec. 6, 1947	Nov., 1947	Sept., 1947	Dec., 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.55c
Steel bars, del. Philadelphia	3.318	3.318	3.28	2.91
Steel bars, Chicago	2.90	2.90	2.90	2.55
Shapes, Pittsburgh	2.80	2.80	2.80	2.35
Shapes, del. Philadelphia	2.954	2.954	2.94	2.48
Shapes, Chicago	2.80	2.80	2.80	2.35
Plates, Pittsburgh	2.95	2.95	2.95	2.50
Plates, del. Philadelphia	3.17	3.17	3.15	2.558
Plates, Chicago	2.95	2.95	2.95	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.48
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.19
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.90	†3.675
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.481
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.219
Sheets, No. 10 galv., Gary	3.90	3.90	3.90	†3.675
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.462
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.162
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.05
Wire nails, Pittsburgh	4.625	4.625	4.25	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	39.00
Rerolling billets, Pittsburgh	47.50	47.50	47.50	39.00
Wire rod 7/32 to ¼-inch, Pitts.	3.05c	3.05c	2.925c	2.425c

‡ Base, No. 5 to 5/16-in.

Pig Iron

	Dec. 6, 1947	Nov., 1947	Sept., 1947	Dec., 1946
Bessemer, del. Pittsburgh (N.&S. sides)	$37.913	$37.83	$37.83	$31.77
Basic, Valley	36.00	36.00	36.00	29.50
Basic, eastern del. Philadelphia	38.84	38.84	38.72	31.93
No. 2 fdry., del. Pgh. (N.&S. sides)	37.41	37.413	37.33	31.27
No. 2 fdry., del. Philadelphia	39.34	39.34	39.22	32.43
No. 2 foundry, Chicago	36.00	36.00	36.00	30.00
No. 2 foundry, Valley	36.50	36.50	36.50	30.00
Southern No. 2, Birmingham	34.88	34.88	34.51	26.88
Southern, No. 2, del. Cincinnati	38.74	38.544	39.38	30.94
Malleable, Valley	36.50	36.50	36.50	30.00
Malleable, Chicago	36.50	36.50	36.50	30.00
Charcoal, low phos., fob Lyles, Tenn.	50.00	46.40	44.00	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.00	$40.00	$38.00	$28.50
Heavy melt. steel, No. 2, E. Pa.	42.50	42.50	36.75	27.38
Heavy melt. steel, No. 1, Chicago	38.75	38.75	38.75	27.19
Heavy melt. steel, No. 1, Valley	39.75	39.875	39.50	28.75
Heavy melt. steel, No. 1, Cleveland	39.25	39.625	38.25	28.50
Heavy melt. steel, No. 1, Buffalo	42.50	41.81	39.00	26.63
Rails for rerolling, Chicago	55.50	56.25	46.25	31.00
No. 1 cast, Chicago	49.00	49.00	43.50	36.88

Coke

Connellsville, beehive furnace	$12.25	$12.25	$12.00	$8.75
Connellsville, beehive foundry	14.50	14.50	14.50	9.50
Chicago, oven foundry, del.	18.60	18.60	18.50	15.29

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $66 to $92.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-$70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to ½-in., inclusive, $2.80-3.30 per 100 lb. 7/32 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.351c; Phila., del., 3.318c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

†Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.02c; New York, del., 3.12c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 4.001c; Philadelphia, del., 3.968c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.85c-3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.27c; Philadelphia, del., 4.17c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c.

Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c.

Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c.

Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c, over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c*; Geneva, Utah, (base, del.), 3.125c; New York, del. 3.27c; Phila., del., 3.17c; Boston, del., 3.423c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 4.45c, basing points.)

* At Claymont, Del., 3.30c base price applies on all grades lower than flange quality steel.

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.02c; Phila., del., 2.954c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.
Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.
Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads
Bright, basic or bessemer.....*$3.55-3.80
Spring (except Birmingham)....**$4.25-**4.50
Wire Products to Trade
Nails
Standard and cement-coated .....†$4.25-5.00
Galvanized .....‡$4.00-4.75
Staples, polished and galvanized.....$4.25-5.00
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$4.20
Galvanized (6 to 8 base) ..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier...††91-101
Barbed wire, 80-rod spool ..... ††101
Barbless wire, twisted 101
Fence Posts (no clamps)..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del.), $4.56, bright basic only.
** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.
† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.
‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.
§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.
†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $55-$56 per net ton.
Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12. del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter.....	46 off
¾-in. and larger x 6-in. and shorter...	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter.....	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller.....	46 off	.....
½-in. and smaller.....	.....	44 off
⅝-in.-1-in.	44 off	.....
⅞-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger.....	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright).....	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter.....	48 off
¾, ⅞, & 1 x 6 and shorter.....	44 off

Square Head Set Screws

Upset 1-in. and smaller.....	57 off
Headless, ¼-in. and larger.....	40 off
No. 10 and smaller.....	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
⅜-in. and under	55 off
Lebanon, Pa. .....55 off plus 15c per cwt.	

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$37.00	$37.50	$38.00	$38.50
Newark, N. J., del.	39.02	39.52	40.02	40.52
Brooklyn, N. Y., del.	....	40.80	44.30	....
Philadelphia, del.	38.84	39.34	39.84	40.34
Birmingham, base	32.88*	33.38*	....	....
Baltimore, del.	....	40.42	....	....
Chicago, del.	....	36.72	....	....
Cincinnati, del.	....	38.74	....	....
Newark, N. J., del.	....	39.14	....	....
Philadelphia, del.	....	38.96	....	....
St. Louis, del.	....	37.77	....	....
Buffalo, base	36.00*	36.00*	36.50*	37.00
Boston, del.	43.128	43.128	46.63	44.13
Rochester, del.	38.02	38.02	38.52	39.02
Syracuse, del.	38.75	38.75	39.25	39.75
Canton, Massillon, O., base	35.50	36.00	36.50	....
Chicago, base	35.50	36.00	36.50	37.00
Milwaukee, del.	36.95	37.45	37.95	38.45
Muskegon, Mich., del.	....	40.21	40.71	....
Cleveland, fob furnace	35.50*	36.00*	36.50*	37.00
Akron, del.	37.34	37.84	38.34	38.84
Duluth, base	36.00	36.50	37.00	37.50
Erie, Pa., base	35.50	36.00	36.50	37.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	36.50	37.00	....	....
St. Louis, del.	37.33	37.83	....	....
♦Neville Island, Pa., base	36.00	36.50	36.50	37.00
Pittsburgh, del., N.&S. Sides	36.913	37.413	37.413	37.913
Provo, Utah, base	36.00	36.50	....	....
Seattle, Tacoma, Wash., del.	....	43.03	....	....
Portland, Oreg., del.	....	43.03	....	....
Sharpsville, Pa., base	36.00	36.50	36.50	37.00
Steelton, Pa., base	37.00	37.50	38.00	38.50
Struthers, O., base	36.50	37.00	37.00	37.50
Swedeland, Pa., base	41.00	41.50	42.00	42.50
Troy, N. Y., fob furnace	39.50	....	40.00	....
Toledo, O., base	35.50	36.00	36.50	37.00
Cincinnati, del.	39.35	39.85	....	....
Youngstown, O., base	36.00	36.50	36.50	37.00
Mansfield, O., del.	39.28	39.78	39.78	40.28

† To Neville Island base add: 72.6c for McKees Rocks, Pa., $1.111 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; $1.463 Oakmont, Verona; $1.639 Brackenridge.

• Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Aug. 13; $4.00 higher for No. 2 foundry and malleable and $3.50 higher for basic at Buffalo, and $3.75 higher at Cleveland, effective on shipments during week ended Dec. 7.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron:** Si 14.01-14.50%, $70.75, Jackson, O.; $73.75, Niagara Falls; $73, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$50.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00. Philadelphia, $44.376, delivered. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.60
Chicago, del.	18.60
Terre Haute, del.	18.15
Milwaukee, ovens	18.25
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	17.00
Cincinnati, del.	18.10
Ironton, O., ovens	16.00
Erie, Pa., del.	18.35
Painesville, O., ovens	17.10
Cleveland, del.	18.50
Buffalo, del.	19.20
Detroit, del.	18.25
Philadelphia, ovens	16.90
Swedeland, Pa., ovens	16.90
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	16.25
Pittsburgh, del.	18.21

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	19.00†
Toluol, two degrees	23.00
Industrial xylol	25.00•
Solvent naphtha	25.00•

Per pound fob works

Phenol (car lots, returnable drums)	12.00§
Do., less than carlots	12.75§
Do., tank cars	11.00§

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00•

Per ton, bulk, fob plants

Sulphate of ammonia	$35.00‡

• Effective Aug. 1. † Freight allowed up to 2 cents. ‡ Effective July 21. § Effective Oct. 1.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$30-$32

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

• Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (8 4140)	Structural Shapes	Carbon ⅝"-¾"	Floor ⅝" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
††New York (city)	4.91	6.12	5.82[5]	6.11	7.36	5.03	....	5.02	5.57	7.00[5]	4.75	5.06	6.76
New York (country)	4.76	5.97	5.67[5]	5.96	7.21	4.88	....	4.87	....	....	4.60	4.91	6.61
Philadelphia (city)	4.67	6.28	5.88	5.87	7.12	4.78	5.68	4.83	5.53	7.15[5]	4.55	4.82	6.31
Philadelphia (country)	4.57	6.18	5.78	....	....	4.68	5.58	4.73	....	....	4.45	4.72	6.21
Baltimore (city)	4.31†	5.91	5.61	5.71	6.96	4.76	....	4.81	5.51	....	4.68	4.76	6.26
Baltimore (country)	4.21†	5.81	5.51	5.50	6.75	4.66	....	4.71	....	....	4.58	4.66	6.16
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[13]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.80	....	....	....	....	....	....	5.10	5.90	....	5.05	5.05	6.80
Memphis, Tenn. (city)	4.82[30]‡‖	5.87[30]†	....	6.37	....	5.02[30]	....	4.97[30]	5.87	....	4.97[30]	5.17[30]	6.87[30]
Memphis, Tenn. (country)	4.72[30]‡‖	5.77[30]†	....	6.27	....	4.92[30]	....	4.87[30]	5.77	....	4.87[30]	5.07[30]	6.77[30]
Buffalo (city)	4.45	....	5.20[5]	6.00	....	4.70	5.65	4.40	5.10	6.65	4.40	4.95	6.20
Buffalo (country)	4.30	....	5.05[5]	5.55	....	4.25	5.50	4.25	4.95	6.65	4.25	4.45	5.75
Pittsburgh (city)	4.25‡‖	....	5.10[5]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10‡‖	....	4.95[5]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[5]	5.20[5]	5.78	7.03	4.52	5.35	4.40	5.10	6.85	4.65	4.60	6.15
Cleveland (country)	4.30	5.35[5]	5.05[5]	....	....	....	5.20	4.25	4.95	....	....	4.45	....
Cincinnati	4.671	5.516[5]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[9]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[5]	5.20[5]	5.65	6.90	4.35	5.45	4.40	5.10	6.65[5]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[5]	5.05[5]	5.50	6.75	4.20	5.30	4.25	4.95	6.65[5]	4.25	4.45	5.90
Milwaukee	4.629	5.679[5]	5.379[5]	5.829	7.079	4.529	5.629	4.579	5.279	6.979[5]	4.579	4.779	6.229
St. Louis	4.78	5.83[9]	5.53[9]	6.02	7.27	4.68	5.82	4.73	5.47[12]	....	4.73	4.93	6.38
Birmingham (city)	4.45[30]‡‖	....	....	5.65	....	4.45[30]	....	4.40[20]	5.93[32]	....	4.40	4.65	6.86
Birmingham (country)	4.30[30]‡‖	....	....	5.50	....	4.30[30]	....	4.25[30]	....	....	4.25	4.50	....
New Orleans	4.98[30]**	....	6.29[18]	....	....	5.18[30]	....	5.13[30]**	6.29[11]	....	5.03[30]**	5.33[30]	7.29[30]
Omaha, Nebr.	5.365	....	....	6.565	7.815	5.265	....	5.315	6.015	....	5.315	5.515	6.965
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[13]	7.70	5.85	5.35	6.50
Los Angeles (city)	5.75	7.75[5]	7.45[5]	7.40	8.80	6.05	8.70	5.50	7.35[32]	9.35[16]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[5]	7.30[5]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[16]	5.20	5.40	7.50
San Francisco	5.20[31]	6.65[5]	....	6.85[5]	7.75[5]	5.75[31]	8.70[15]	5.05[31]	7.00[13]	9.35	5.20[31]	5.30[31]	7.10[31]
Seattle, Tacoma, Wash.	5.30[17]‡‖	....	7.10[5]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[19]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]‡‖	....	7.10[5]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [32]—500 to 1499 lb.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ‖ as rolled; **add 0.40 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si.). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburg. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $153, ton lot $165, less ton $172; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23c, ton lot 23.6c, less ton 24.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17c, ton lot 17.6c, less ton 18.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.4c per lb of alloy, carload packed, 7.95c, ton lot 8.45c, less ton 8.95c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 17.6c per lb of contained Cr, c.l., packed 18.2c, ton lot 18.8c, less ton 19.5c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 19.1c per lb of contained Cr, c.l., packed 19.7c, ton lot 20.4c, less ton 21.35c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 27c per lb of contained Cr, 0.04% C 26c, 0.05% C 25.5c, 0.06% C 25c, 0.10% C 24.5c, 0.15% C 24.0c, 0.20% C 23.75c, 0.50% C 23.5c, 1% C 23.0c, 2% C 22.5c. Carload packed add 0.8c, ton lot add 1.35c, less ton add 2.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, and C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 23c per lb of contained chromium, carload, packed 23.8c, ton lot 24.35c, less ton 25.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, bulk, max. 0.50% C grade, 87c per lb of contained chromium, carload packed 88c, ton lot 89.5c, less ton 91.5c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 8.8c per lb of contained Si, carload packed 10c, ton lot 10.65c, less ton 11.3c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.2c per lb of contained Si, carload packed 12.25c, ton lot 12.85c, less ton 13.45c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 12.7c per lb of contained Si, carload packed 13.7c, ton lot 14.25c, less ton 14.8c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 14.35c per lb of contained Si, carload packed 15.35c, ton lot 15.85c, less ton 16.35c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.65c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 16.5c per lb of Si, c.l. packed 17.5c, ton lot 18c, less ton 18.5c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 11.1c per lb of briquet, carload packed 11.6c, ton lot 12c, less ton 12.4c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8c per lb of briquet, c. l. packed, 8.6c, ton lot 9c, less ton 9.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si) Eastern Zone, contract, c.l., bulk 7.65c per lb of briquet, c.l. packed 8.25c, ton lot 8.65c, less ton 9.05c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.
Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 4.65c per lb of briquet, c.l. packed 5.25c, ton lot 5.65c, less ton 6.05c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 4.8c, c.l. packed 5.4c, ton lot 5.8c, less ton 6.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 16.75c per lb of alloy, carload packed 17.35c, ton lot 18.85c, less ton 19.85c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 15.5c per lb of alloy, carload packed 16.5c, ton lot 18c, less ton 19c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.
Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6. 63c; No. 79. 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. **(Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.).** Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.
Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.55c, ton lot 6.9c, less ton 7.25c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.
35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western, add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, ton lots. 1" x D, $1.20 per lb of alloy, freight allowed. Less ton lots $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.
Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.
Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.
Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.
CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, bulk 15.75c per lb of material, carload packed 16.5c, ton lot 17.25c, less ton 18c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.
Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 37c per lb of alloy, ton lot 39c, less ton 41c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.
SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 14.3c per lb of alloy, ton lot 15.05c, less ton 15.8c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.
Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.
Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.
Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

National Minerals Advisory Council Planned

NEW YORK — With only minor price changes announced last week in the nonferrous metal markets, interest centered in Secretary of the Interior J. A. Krug's plan to establish a National Minerals Advisory Council. He has invited 31 leaders in the ferrous and nonferrous metals and nonmetallics industries to meet with him on Dec. 12 to advise on policy and program relating to the mineral supply position of the country. It was pointed out that the Department of Interior has extensive programs in the mineral field which perhaps should be extended, and certainly improved.

COPPER — Only a few orders have been booked by custom smelters for delivery of copper in January, leading mine producers having delayed opening their books for that month. Some consumers are still seeking additional December tonnages to round out their needs but generally have been unsuccessful. Copper and brass mills have revised their freight allowances, effective as of Nov. 25, to provide that all shipments will be fob mill, with freight paid by seller on single shipments of 200 pounds or more, rather than 100 pounds. Quantity schedules also have been revised in columns A, C and D. Some extras also were revised. Shipments of brass and bronze ingots increased to 22,806 tons in October from 19,025 tons in September and compared with 31,461 tons in October, 1946.

Representatives of ferrous, nonferrous and nonmetallics industries would advise Secretary of Interior

LEAD—Eagle-Picher Sales Co. has increased its prices, effective Dec. 1, for lead oxides, less than carload lots, 10 cents per 100 pounds; for lead pigments, 0.25 cent per pound. This action follows similar advances announced by National Lead Co. on Oct. 1.

The market is now quoted as follows for carloads: Litharge, 17.60c; dry red lead, 18.60c; orange mineral, 21.10c. For less than carload lots prices are 10 points higher. Dry white lead is quoted 16.50c per pound; sublimed white lead, 15.75c; and sublimed blue lead, 15.75c, all less than carload lots. Carload lots are quoted 1/2-cent lower.

Demand for primary lead continued brisk last week at firm prices. At least one seller opened his January books.

ZINC — Only routine business was transacted in the domestic zinc market last week, prices holding at 10.50c, East St. Louis, for prime western.

TIN — Reconstruction Finance Corp. purchased an additional 975 tons of Straits tin for delivery at Singapore or Penang during November, making a total of 2500 tons purchased last month. This brings total pig tin during the first 11 months of this year to about 33,800 tons, of which about 16,750 tons came from Malaya. Many trade authorities believe a fairly substantial upward revision in prices will be made soon.

MAGNESIUM — Dow Chemical Co. has announced that future orders for virgin magnesium ingot will be priced at 20.50c per pound, fob Freeport, Tex. The new price, effective as of Dec. 1, is expected to increase the cost to customers an average of 1 cent per pound. Magnesium alloys and structural products are not affected.

PLATINUM — A leading refiner increased the price of platinum $4 an ounce, effective Dec. 4, to the basis of $66 in large lots and $69 in small lots. Higher price is result of continued good demand from jewelry and industrial users and a scarcity of spot supplies, the latter aggravated by the lack of Russian offerings since mid-year. At the end of September, stocks totaled 132,180 ounces compared with 187,624 ounces on Dec. 31, 1946.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 17.50c-18.00c; 88-10-2 (No. 215) 25.75-26.25c; 80-10-10 (No. 305) 21.50-22.00c; No. 1 yellow (No. 405) 13.75-14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.25-15.50c; No. 12 foundry alloy (No. 2 grade) 14.75-15.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.75-15.00c; grade 2 (92-95%) 13.75-14.00c; grade 3 (90-92%) 13.25-13.50c; grade 4 (85-90%)12.75-13.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.
Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.80	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper 16.25, composition red brass 14.00, auto radiators 10.75, heavy yellow brass 9.75, brass pipe 11.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.75, No. 2 copper 17.75, light copper, 16.50-16.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50, No. 2 15.50, light copper 14.50, No. 1 composition red brass 12.00-12.50, No. 1 composition turnings 11.50, mixed brass turnings 8.00, new brass clippings nom. 12.00-12.50, No. 1 brass rod turnings 10.00-10.50, light brass 6.00-6.50, heavy yellow brass 8.00-8.25, new brass rod ends 10.00-10.50, auto radiators, unsweated 9.00-9.50, cocks and faucets 9.25-9.50, brass pipe 9.00-9.25.

Lead: Heavy 12.00, battery plates 6.50-6.75, linotype and stereotype 14.00-14.50, electrotype 11.50-12.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00, new die cast scrap 4.00-4.50, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S 8.50-9.00, old sheets 6.50-7.00, crankcases 6.00-6.50, borings and turnings 2.00-2.50, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. Average	21.50	14.825	10.50	80.00	15.00	33.00	35.00	74.625
Dec. 1-4	21.50	14.80-14.85	10.50	80.00	15.00	33.00	35.00	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electro. cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	40.00
No. 1 Busheling	40.00
Nos. 1, 2 and 3 Bundles	40.00
Machine Shop Turnings	35.50-36.00
Mixed Borings, Turnings	35.50-36.00
Short Shovel Turnings	37.75-38.25
Cast Iron Borings	36.00-36.50
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Elec. Furnace Bundles	46.50-47.00
Heavy Turnings	39.50-40.50

Cast Iron Grades

No. 1 Cupola	52.50-53.50
Charging Box Cast	43.00-44.00
Heavy Breakable Cast	40.00-41.00
Unstripped Motor Blocks	45.00-46.00
Malleable	59.00-60.00
Brake Shoes	41.00-42.00
Clean Auto Cast	52.50-53.50
R.R. Malleable	59.00-60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00
R.R. Malleable	59.00-60.00
Axles	49.00-50.00
Rails, Rerolling	53.50-54.00
Rails, Random Lengths	49.50-50.00
Rails, 3 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Railroad Specialties	51.50-52.50
Uncut Tires	49.00-50.00
Angles, Splice Bars	50.00-51.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.00-39.50*
No. 2 Heavy Melt. Steel	39.00-39.50*
No. 1 Busheling	39.00-39.50*
Nos. 1 & 2 Bundles	39.00-39.50*
Machine Shop Turnings	33.00-33.50
Mixed Borings, Turnings	33.00-35.00
Short Shovel Turnings	35.00-35.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Heavy Turnings	38.00-38.50
Alloy Free Turnings	37.00-38.00
Cut Structurals	50.00-52.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	55.00-58.00
Charging Box Cast	50.00-52.00
Stove Plate	52.00-54.00
Heavy Breakable Cast	50.00
Unstripped Motor Blocks	50.00-51.00
Malleable	64.00-66.00
Brake Shoes	48.00
Clean Auto Cast	56.00-58.00
No. 1 Wheels	52.00
Burnt Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00
R.R. Malleable	64.00-66.00
Rails, Rerolling	56.00
Rails, Random Lengths	53.00-54.00
Rails, 3 ft and under	57.00-60.00
Cast Steel	52.00-53.00
Railroad Specialties	52.00-53.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	54.00-56.00

VALLEY

No. 1 Heavy Melt. Steel	39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Bundles	39.50-40.00*
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings	35.00-35.50
Cast Iron Borings	47.00-48.00
Low Phos.	47.00-48.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00

MANSFIELD

Machine Shop Turnings	36.50-37.50
Short Shovel Turnings	36.50-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	48.00
Charging Box Cast	40.00
Heavy Breakable Cast	42.00
Stove Plate	40.00
Unstripped Motor Blocks	39.00
Brake Shoes	36.00
Clean Auto Cast	47.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	58.00
Rails, Rerolling	48.50
Rails, Random Lengths	46.50
Rails, 18 in. and under	51.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	29.50-30.00
Cast Iron Borings	29.50-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Heavy Breakable Cast	38.00-39.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$41.50-43.50
No. 2 Heavy Melt. Steel	39.25-40.25
No. 1 Busheling	39.25-40.25
No. 1 & 2 Bundles	39.25-40.25
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Los Phos.	45.00-47.00
Elec. Furnace Bundles	44.00-45.00

Cast Iron Grades

No. 1 Cupola	48.00-50.00
Heavy Breakable Cast	43.00-44.00
Malleable	52.00-54.00
No. 1 Wheels	51.00-53.00
Stove Plate	47.00-49.00

Railroad Scrap

Rails, 3 ft. and under	50.00-52.00
Railroad Specialties	49.00-51.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
No. 1, No. 2 Bundles	42.00-43.00
No. 3 Bundles	40.00-41.00
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	35.00-36.00
Bar Crop and Plate	47.50-48.50
Punchings & Plate Scrap	47.50-48.50
Cut Structurals	47.50-48.50
Elec. Furnace Bundles	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
No. 1 Machinery Cast	52.00-54.00
Charging Box Cast	50.00-51.00
Heavy Breakable Cast	50.00-51.00
Unstripped Motor Blocks	47.50-48.00
Malleable	60.00-62.00
Clean Auto Cast	52.00-54.00
No. 1 Wheels	52.00-53.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.00-37.00
No. 2 Heavy Melt. Steel	34.00-37.00
No. 1 Busheling	34.00-37.00
Nos. 1 & 2 Bundles	34.00-37.00
No. 3 Bundles	32.00-35.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings	30.00-31.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles	40.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	43.00-44.00
Heavy Breakable	43.00-44.00
Unstripped Motor Blocks	40.00-42.00
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings	28.50-29.50
Bar Crops and Plate	32.50-33.50
Punchings & Plate Scrap	32.50-33.50
Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast	38.00-39.00
Stove Plate	38.00-39.00
Unstripped Motor Blocks	36.00-37.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
Nos. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Punchings	44.50-45.00
Elec. Furnace Bundles	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	43.50-44.00

Cast Iron Grades

No. 1 Cupola Cast	48.00-50.00
Clean Auto Cast	48.00-50.00
No. 1 Wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.50-45.00
Malleable	64.00-65.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	51.00-52.00
Rails, 3 ft and under	52.00-53.00
Rails, 18 in. and under	54.00-55.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	51.00-52.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	37.00-38.00
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings	33.00-34.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	47.00-50.00
Mixed Cast	45.00-47.00
Heavy Breakable Cast	40.00-41.00
Brake Shoes	46.00-47.00
Clean Auto Cast	48.00-49.00
Burnt Cast	45.00-46.00

Railroad Scrap

R.R. Malleable	60.00-62.00
Rails, Rerolling	56.00-59.00
Rails, Random Lengths	50.00-52.00
Rails, 3 ft and under	54.00-55.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	37.50-38.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Steel Bars . . .

Hot carbon bars remain tight, but users hopeful as next quotas stay unchanged

Bar Prices, Page 146

New York — Consumers of hot carbon bars, especially small sizes, continue to have difficulty in obtaining sufficient tonnage to meet requirements. In fact, most report that producers are behind on current commitments. Some, however, find encouragement in fact that first quarter quotas are no smaller than those now being received, which is not the case with sheets, pipe and plates. This position is not universally true with respect to maintenance of bar volume, for there are one or two large producers who appear to be in actually worse position than ever.

Meanwhile, cold-drawn carbon bars are in fairly easy supply. Deliveries can be had on most sizes within a few weeks, especially on the medium and large specifications. To bolster backlogs, producers are accepting such future business as is being offered. Instead of confining orders to the first quarter only, they are willing to make commitments for the second and third quarters and even beyond in certain cases. Hot and cold alloy bars are easy, with shipments available within five to six weeks.

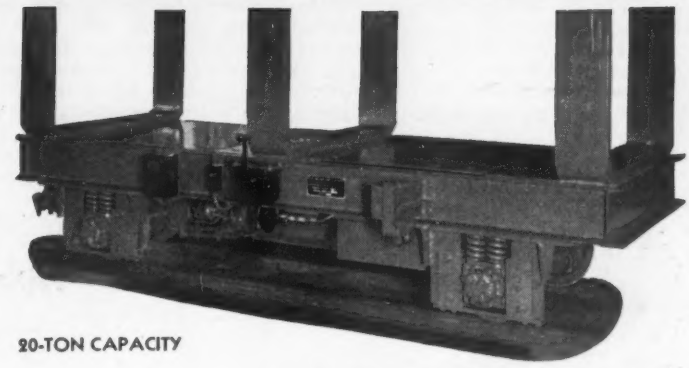
Boston—More steel users are clearing inventories of sizes and grades no longer required, tonnage bought earlier of specifications since revised. Included are bars and among those shaking down inventories are textile machinery builders, electrical appliance producers and others. Demand for hot-rolled carbon bars is strong with consumers taking up full allocations for first quarter; this is not always the case in cold-finished. Carryovers of hot-rolled hold down quotas, but some producers hope there will be slightly more tonnage for second quarter provided semifinished is sufficient to maintain schedules over the next three months.

Pittsburgh — Wyckoff Steel Co. and Columbia Steel & Shafting Co. revised their extra cards last week in line with upward adjustments initiated recently by Republic Steel Corp. in size and grade extras. Cold finishers report continued slight improvement in new bookings and are particularly encouraged over wide diversification of these orders among their customers. Some of the large cold-finished bar sizes still are available from stock, although deliveries on smaller classifications are extended 60 days in some instances.

Crucible Steel and Carnegie-Illinois Steel Corp. last week also increased the grade and size extras on hot-rolled alloy bars and semifinished items in line with that recently announced by Republic Steel Corp. Agricultural and automotive interests continue to order on somewhat larger scale than earlier this year.

Philadelphia — While there is not the tension in hot carbon bar demand that there is in some of the other major steel products, most consumers look for a little more tonnage over the next few months than they are now receiving, especially in the smaller sizes. Certain sellers will actually

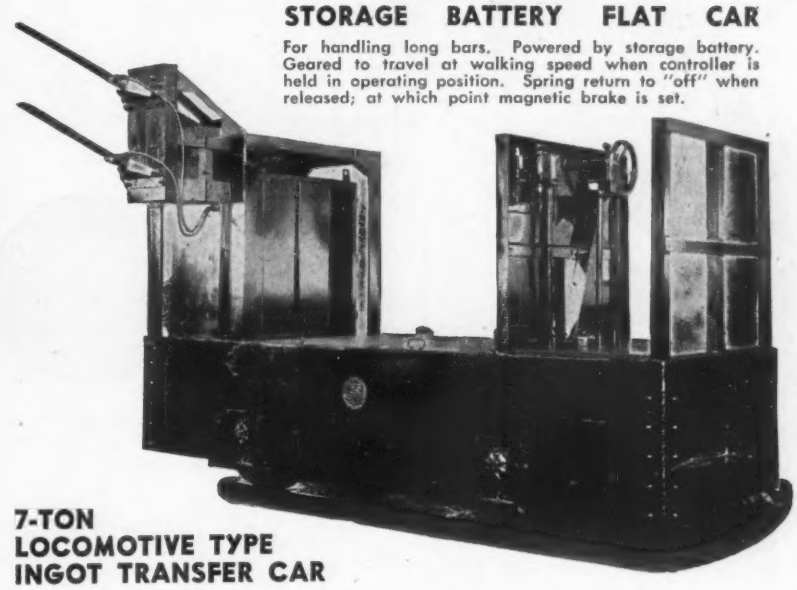
ATLAS
INTRAPLANT HAULAGE
EQUIPMENT



20-TON CAPACITY

STORAGE BATTERY FLAT CAR

For handling long bars. Powered by storage battery. Geared to travel at walking speed when controller is held in operating position. Spring return to "off" when released; at which point magnetic brake is set.



7-TON
LOCOMOTIVE TYPE
INGOT TRANSFER CAR

Operator station in elevated position at one end of car with magnetic switch control located opposite end. Car is provided with hydraulic brake system with anti-friction roller bearing—spring mounted journals.

BUILDERS OF:

DIESEL ELECTRIC AND STORAGE BATTERY LOCOMOTIVES FOR INTRAPLANT HAULAGE

SCALE CHARGING CARS AND ORE TRANSFERS FOR BLAST FURNACE STEEL PLANTS

COAL CHARGING CARS, CLAY CARRIERS, DOOR EXTRACTORS, COKE GUIDES AND COKE QUENCHING CARS FOR BY PRODUCT COKE PLANTS

TURNTABLES

INDICATING AND RECORDING DIALS FOR WEIGHING SCALES

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

have less to offer, but producers generally will be able to supply as much new tonnage in first quarter quotas as they now are doing, and may be able to supply a little more.

Cleveland — Inability to obtain sufficient quantities of carbon steel bars has influenced some consumers to seek alloy bars as a substitute, but one producer is discouraging such a shift unless alloy can be used permanently to better advantage than carbon. This producer does not wish to contribute to building up a product demand that will be but temporary. Increased inquiries for hot-rolled carbon bars 1-in. and over are being reported, the demand coming from forging plants. A few weeks ago pressure for the larger bars had eased a bit.

Tin Plate . . .

Tin Plate Prices, Page 147

Pittsburgh — Some industry officials contend that unless the government is successful in its efforts to control the distribution of all steel products to save steel for most urgent uses, the effect of imposing restrictions on use of tin plate for beer and possibly other items such as coffee and oil containers, would be lost to some extent to applications of perhaps less importance than from which the savings were derived. For beer cans alone it is estimated about 200,000 tons of tin plate will be consumed this year. Distribution of finished steel output on a voluntary allocation basis to meet urgent needs under the Marshall Plan is preferred by industry officials and consumers alike to government mandatory distribution regulations.

Too many variables prevent an accurate estimate of trend in tin plate production next year. Considerable new tin plate capacity is due to come in next year but such variables as possibility of equipment delivery delays, and control of all steel distribution by the government (which would have to be approved by Congress) make it difficult to forecast accurately 1948 production prospects.

Sheets, Strip . . .

Sheet Prices, Page 146

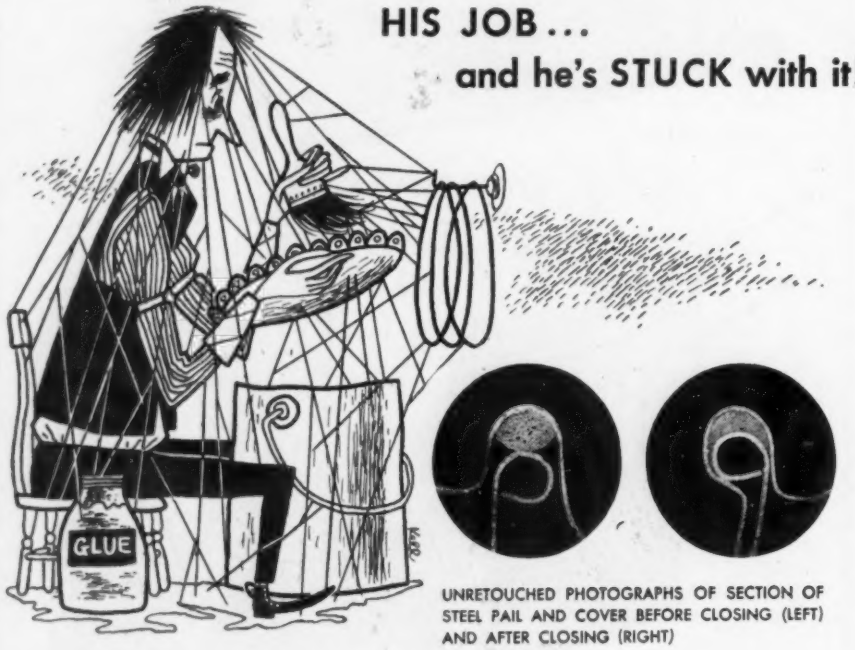
Pittsburgh — In contrast to the situation earlier this year, major consumers of sheets and strip have become resigned to fact that there just isn't enough tonnage to fulfill all requirements. Output has fallen well behind projected production schedules, but those for 1948 are being set up on a more realistic basis.

Extent of the shortage in flat-rolled steel is indicated by fact leading electrical household appliance manufacturers could have increased output nearly 35 per cent this year if the steel had been available. Some of these interests contend that hot-rolled steel supply is "drying" up with cold-reduction mills absorbing an increasing proportion; cold-rolled sheets are in little better supply than hot-rolled, and inventories of this item are somewhat greater than those of last July. Silicon sheets are expected to remain tight through first half of 1948, with a gradual easing anticipated later in the year. Production of enameling sheets is falling far short of meeting current needs, and this situation is expected to become more critical. Some appliance manufacturers have attempted to substitute cold-rolled sheets for enameling stock, but found it impossible to achieve desirable enamel finish. Aluminum also has been substituted for steel by appliance producers, and in some instances may continue to be used when steel is in greater supply.

Hot and cold-rolled carbon strip producers here have not yet revised pickling, chemical requirements, extensometer tests and packaging extras along lines initiated by Republic Steel Corp. recently. However, such upward adjustments in extras are said to be justified in line with actual mill costs, and official action is indicated soon among producers here.

New York — Feeling the squeeze of the enlarged car program, sheet producers are further revising their first quarter quotas. With few exceptions, sheet buyers not identified with car construction will receive less tonnage in the first quarter than at present. Some increased capacity in the East will make itself felt before the first quarter is over, but probably not to the extent anticipated because of shortage of metallics and difficulties attending the breaking in of new facilities. Principal shortage is in cold-rolled and galvanized sheets, with hot sheets not far behind. Electrical sheets are in slightly easier position, with the probability that as much, if not more, will be available in first quarter. Stainless steel production is in fair balance with de-

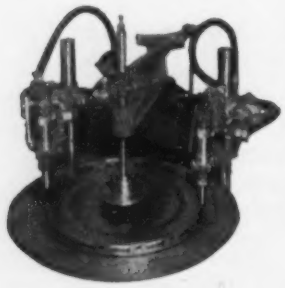
HIS JOB . . .
and he's STUCK with it!



UNRETOUCHED PHOTOGRAPHS OF SECTION OF STEEL PAIL AND COVER BEFORE CLOSING (LEFT) AND AFTER CLOSING (RIGHT)

But you won't be if you use Darex* "Flowed-In" Sealing Compounds to make the gaskets for your steel products. Gaskets made from Darex Sealing Compounds, unlike preformed gaskets, require no glue to stick them in place.

In steel pail covers, for example, Darex Sealing Compounds are mechanically "flowed-in" to cover grooves in liquid form. The water content is then expelled by evaporation. This process leaves a resilient, deformable gasket which conforms exactly to the cover contours and becomes an integral part of the pail itself—a continuous gasket that can't fall out.



In this simple operation using Darex Compounds there is no messy glue, no messy equipment, no messy plant—and your products are protected by a superior gasket.

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CAMBRIDGE, MASS. • CHICAGO, ILL.

T. M. Reg. U. S. Pat. Off.

DAREX "FLOWED-IN" COMPOUNDS MEAN BETTER STEEL PRODUCTS OF ALL KINDS

mand, with deliveries averaging around six weeks.

Boston — Sheet and strip consumers, realizing flat-rolled supply will continue limited for some months, are adjusting potential schedules for production next year accordingly. In doing this more users are more realistic than a year ago. Hot-rolled sheets in lighter gages are especially short and substitutions of other material are more frequent. More aluminum is being employed in duct work in building while some small tank shops are also fabricating more aluminum. Several producers are allocating electrical sheets for second quarter with little change in quotas, although for some grades they are slightly higher.

Philadelphia — While some expansion in sheet capacity is expected after the turn of the year, consumers count on little relief in the first quarter. In fact, buyers likely will receive less in that period than at present, because of increased requirements for the car program and possibly for export. The issuance of licenses under the individual licensing program, which became effective Oct. 1, has developed slowly and it may continue to do so for a while.

Cincinnati—Sheet mills in this district, working on first-quarter allocations, find an absence of usual seasonal changes in demand. This situation is due, of course, to tight supplies. Allocations of sheets for next quarter will approximate those of the current period. Requests for delivery positions in second quarter, point to a continuing gap between sheet supply and needs.

St. Louis — Sheet output here continues restricted due to slab mill trouble at Granite City Steel Co., principal flat steel producer. The company also has been forced to postpone starting its new cold reduction mill until Dec. 10 because of generator difficulties. As a result, customer allotments may not be made before Feb. 1, when the company expects to be abreast of order backlogs. When operations become current, it will cease permanently production of hot-rolled sheets and plates. Demand in the district continues high. Numerous inquiries, which are being rejected, have come in from eastern consumers on news reports of the area's scheduled increased capacity. Calls for light gage sheets are especially insistent.

Wire . . .

Wire Prices, Page 147

St. Louis—Tennessee Coal, Iron & Railroad Co. is low on 2800 tons, 7/16-inch, seven-wire, uncoated steel wire strand for U. S. Engineer, Memphis, at 10.43 cents per pound, total $584,080. Contracts recently let by the Memphis office include one for 492,000 squares, noncorrosive wire reinforcing fabric, Copperweld Steel Co., Glassport, Pa., $2,332,080.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Seattle — The cast iron pipe market is seasonally quiet but new projects are expected to be out within 30 days. Meanwhile agencies are making every effort to speed deliveries on current contracts.

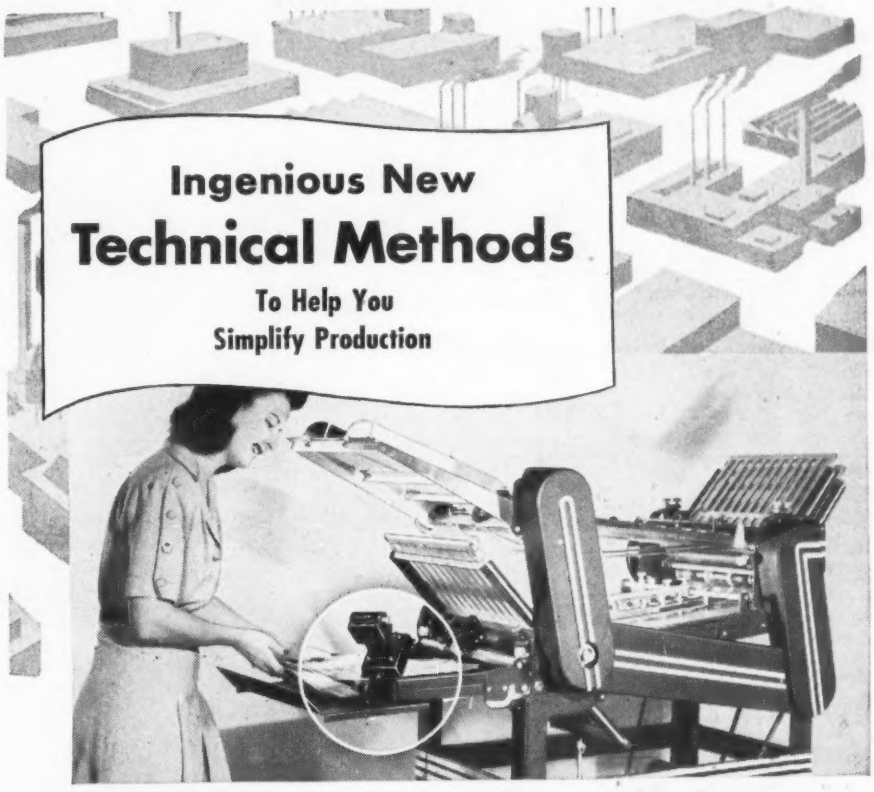
Plates . . .

Plate Prices, Page 147

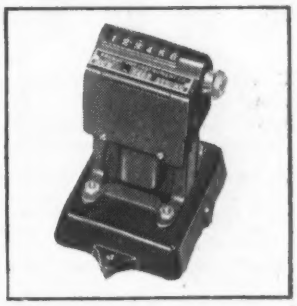
Boston — Of the heavier carbon products, plates remain the most critical as to supply. Several eastern mills are unable to get enough steel to rolling units for scheduled production and are therefore lagging on delivery. This will increase carryovers at the yearend with lower allocations for next quarter. Demand for plate for pipe fabricating and the car building program takes a substantial share of production. Few producers are bidding for navy tonnage. Central Iron & Steel Co., Harrisburg, Pa., was the only producer quoting on the late November tonnage for east and west yards. That mill quoted on only part.

New York — With schedules generally filled for the first quarter, plate producers are accepting little new tonnage at this time and most of it is for delivery in April or beyond. Only a few sellers are accepting these more extended commitments. Certain plate mills in setting up first quarter schedules allowed for heavier allocations for the railroad car program. Others, however, probably will have to take off tonnage already scheduled to meet the new demands for that program. Precisely what these demands will be has not been clarified.

Philadelphia — Most plate sellers are out of the market, except on specialties. Their schedules for the first quarter are filled on plain work, allowing for certain export tonnages which may result in further first-



Instantaneous Production Control With Improved Electric Counter



The Wizard Electric Counter

Accurate, up-to-the-minute counting of the production on this Davidson Folding Machine is done with the WIZARD Electric Counter.

New opportunities for more efficient production and elimination of over-run waste are created by WIZARD Electric Counters. These electrically-operated devices count any object or motion that will operate a switch, relay or photo-electric unit. Objects can be counted photo-electrically without physical contact and without risk to fragile or freshly-painted objects.

The Counters can be installed at any distance from the switch or photo-electric unit where the count originates. Or, they can be mounted on panels in the Production Department and arranged so that a production supervisor can maintain up-to-the-instant counts of all operations throughout the entire plant.

You can also count on chewing gum to help employee's on-the-job efficiency. Chewing gum helps relieve tension—keeps the throat moist—and prevents "false thirst" yet leaves hands free for work. That's why more and more plant owners are making Wrigley's Spearmint Gum available to everyone.

Complete details may be obtained from Production Instrument Company, 710 West Jackson Boulevard, Chicago 6, Ill.

AB-79

quarter adjustments, depending upon what develops under the Marshall Plan.

Birmingham — Concern over the plate situation in this district has increased materially with disclosure that Republic Steel Corp. will start production of steel pipe at its projected Gadsden tube mill probably next March. Plate users, already pinched for supplies, view the development with considerable misgiving, although there has been no announcement as to what proportion of Republic's output will be allocated to that mill. One of the district's largest fabricators laid men off recently due to the continuing plate shortage.

Structural Shapes . . .

Structural Shape Prices, Page 147

Philadelphia — Despite a continued sharp improvement in some districts, structural demand is spotty here. There is more activity at the drawing boards, but tonnage is still slow in coming to a head. However, district fabricators are picking up various tonnages through the East, increasing their substantial backlogs. Recently, shape deliveries have been freer, but the trend is likely to be the reverse for a while. Diversion of more tonnage to the car building program will cut general consumer quotas in the first quarter; in addition, one district mill has suspended operations for a few weeks for repairs.

New York — October structural bookings of 151,519 tons were up 12.5 per cent over the September total, according to the American Institute of Steel Construction, this city. Bookings for the first 10 months were 1,344,124 tons, or 8.7 per cent greater than the average for the same month in the five prewar years of 1936-40. Shipments amounted to 173,580 tons, the largest since August, 1942, and represented an increase of 23 per cent over the average for the same month in 1936-40. Tonnage available for fabrication as of Oct. 31 was 648,808 tons.

Structural demand is active, with a number of projects being placed and a number out for bids. Fabricators look for continued activity, reaching a possible peak on the present movement some time in the spring. Most shops have more inquiries than they can figure. Meanwhile backlogs are becoming more extended, with certain of the larger fabricators booked up seven months or so ahead.

Cleveland — Movement of 65-foot long structurals and plates to fabricators is being handicapped by difficulty of obtaining sufficiently long railroad cars, one producer reports. Even to get sufficient shorter cars so that long structurals and plates can be spread over two cars is difficult.

Seattle — Fabricating plants are more intent on completing current commitments than on seeking new business in view of the shortage of materials which is more acute. Mills have reduced allocations for the first quarter. Many small jobs are offered for industrial and commercial construction.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Seattle — Rolling mills are at peak production with backlogs that will carry well into 1948. Many small jobs, each involving less than 50 tons of reinforcing bars, are being offered for commercial and industrial construction. New business for the first quarter is being taken, preference being given regular customers. Bureau of Reclamation, Denver, has rejected tenders for more than 1000 tons of reinforcing bars for the Columbia Basin project and will invite new bids soon.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 147

Pittsburgh—Producers of fasteners anticipate very little improvement in steel supply through early months of next year, while current production schedules continue restricted due to inadequate inventories of cold-heading stock of hot-rolled wire rods in coils. Some improvement in new order volume is developing in contrast to slight downward trend during the summer months. Deliveries of nuts and bolts under 1/2-inch remain extended 6 to 8 months, while 4 to 5 weeks' delivery is available in some of the large size ranges. Demand for pole line hardware continues at record pace. There is a slight possibility one large interest may temporarily discontinue producing nuts and bolts and concentrate output on this item.

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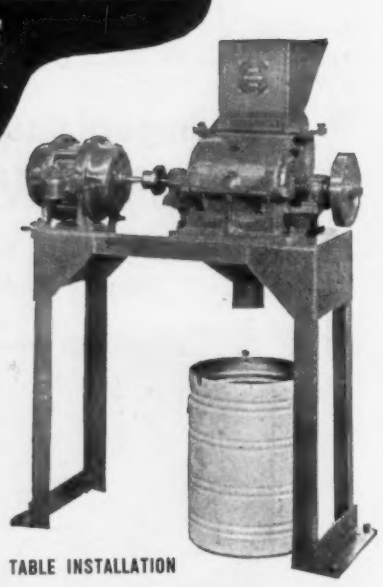

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(Specific data about crusher construction) Two sizes, with capacities from 100 lbs. to 2,000 lbs. per hour.

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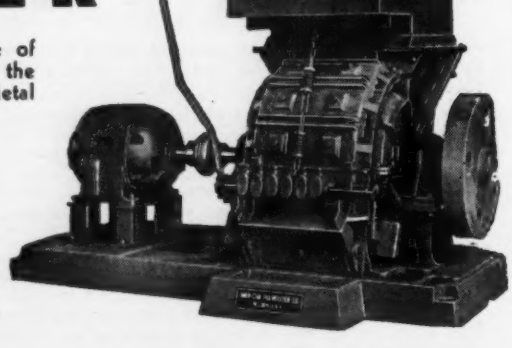
- EASIER HANDLING AND STORAGE—By reducing long curly turnings to chips bulk can be reduced by as much as 80% with consequent savings in storage and shipping space.
- INCREASED CUTTING OIL RECLAMATION. The yield of cutting oil from crushed chips is increased 30 to 50 gallons per ton.
- BETTER BRIQUETING. Greater oil extraction from uniformly reduced chips permits higher analysis briquetting for furnace charging with reduced scrap loss.



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Originators and Manufacturers of Ring Crushers and Pulverizers

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Pig Iron . . .

Pig Iron Prices, Page 148

Cleveland — Foundry pig iron supply tightened further last week as one of American Steel & Wire Co.'s blast furnaces remained down for repairs. With foundries reporting little or no inventories, one foundryman described the situation as "from car to cupola." Reports are circulating that Republic Steel Corp., Cleveland, will take over operation near Buffalo of a blast furnace owned by Colorado Fuel & Iron Corp.'s Wickwire Spencer Steel Division, but Republic officials will merely comment they have heard the reports. Known as furnace "X," it was jointly operated during the war by Republic Steel and Wickwire Spencer. Out of blast around two years, the furnace is reported in need of relining. Its annual pig iron capacity is 180,000 net tons. For a number of years, Republic and Wickwire Spencer have been jointly operating the latter's furnace "Y" near Buffalo. Approximately 40 per cent of this furnace's output is merchant iron for Republic, the remainder going as hot metal for Wickwire Spencer open hearths. It was pointed out that a prime factor today in consideration of blowing in additional blast furnaces is the limited supply of coke.

With numerous blast furnaces scheduled to be taken out of blast in 1948 for much-needed repairs and relining, R. L. Collier, executive vice president, Gray Iron Founders' Society Inc., Cleveland, is suggesting that pig iron producers enter into a voluntary arrangement to serve foundries when, due to furnaces being down for repairs, they are unable to obtain from regular sources of supply.

Reflecting the decline recently in iron and steel scrap, one Cleveland merchant iron producer which pegs its pig iron price to scrap prices lowered its price on basic iron last week to $39.25, fob furnace, down $1.75 from the preceding week. Other sellers are quoting $35.50, fob furnace.

Boston — Foundries enter the winter dependent increasingly on Everett tonnage with prospects slight for more iron from Buffalo and outside points within the next 60 days. Shortages of iron in other districts precludes the likelihood of heavier shipments to this area. There are no foundries down for the lack of iron, but with the Mystic production spread thin, few have inventories usually on hand at this period. Basic melters are generally worse off than foundries and are operating with low reserves.

Philadelphia — Pig iron supply continues critical. The larger of the two stacks at Swedeland, Pa., is expected to resume operations before the week is over, after having been down since Oct. 1 for repairs. However, a furnace at Bethlehem, Pa., is down for repairs, and consumers in general look for little improvement this month, especially with the Birdsboro, Pa., furnace having largely withdrawn from the merchant iron trade and with a southern producer having withdrawn because of a major repair program soon to be started by his by-product coke ovens.

Pittsburgh — Reflecting poor quality grades of coke, pig iron output among leading producers is estimated to be less than 90 per cent of capacity despite fact all their blast furnaces are pouring iron. Some consideration is being given to revising blast furnace rated capacities in line with a more realistic interpretation of inadequate and poor quality fuel supply outlook through 1948.

It is estimated that less than 60 per cent of merchant pig iron requirements in this district is available to the foundry trade. The merchant pig iron shortage is expected to become more critical through the coming months, for to date this year there has not been any lengthy "breather" periods as in 1946 due to coal strikes, etc., to accumulate pig iron stocks. Scarcity of and high prices for scrap have forced many integrated steel producers to increase proportion of pig iron in open hearth operations, while merchant interests find it uneconomical to step up output through greater use of turnings at present high price levels. However, blast furnace interests contend monthly pig iron shipments to foundries and nonintegrated steel interests are above prewar levels.

Although there has recently developed a downward trend in new order volume for gray iron castings, it has not become sufficiently pronounced to make possible any easing in pressure for prompt pig iron shipments. Castings backlogs still remain well extended in most instances due to inability to obtain adequate quan-

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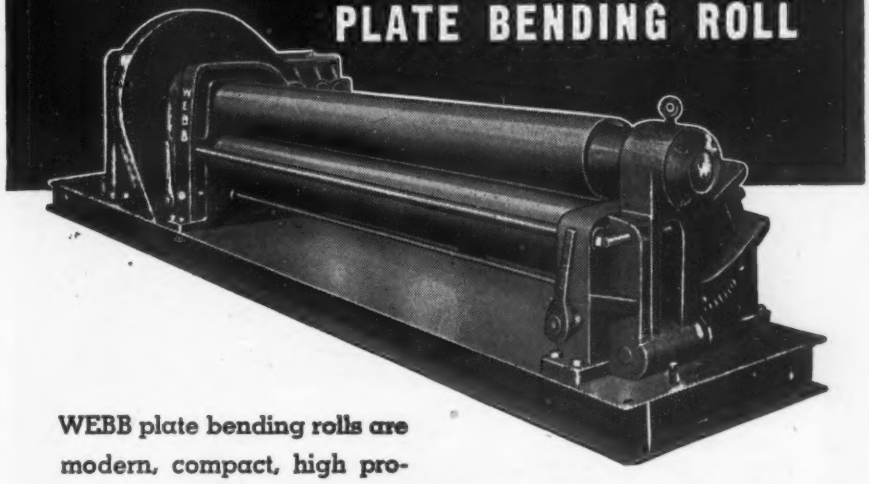

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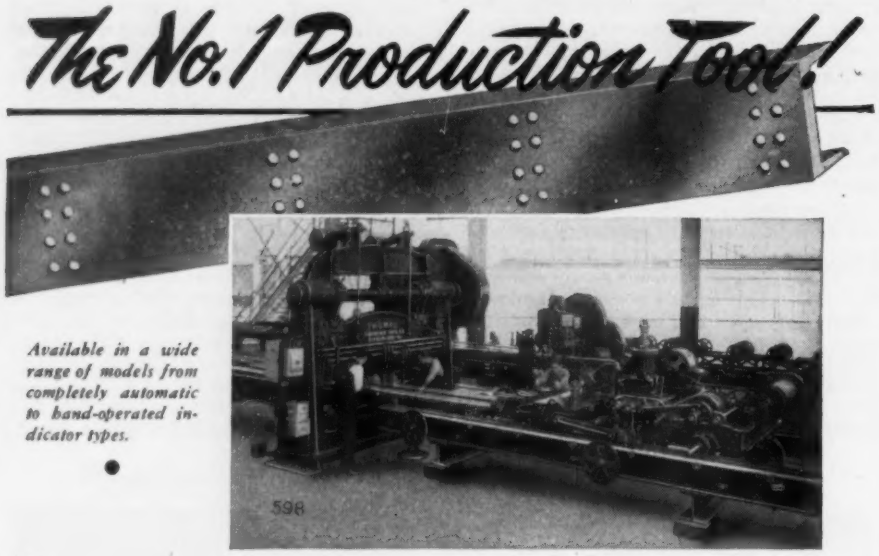

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tities of pig iron, scrap and coke to sustain capacity operations.

Buffalo — Pig iron supply situation reached the desperate stage last week as a Tonawanda producer notified customers that its merchant stack will be shut down soon for relining. As a result, other producers, who have been unable to fill the demands of their own customers, are being contacted. A further recession in foundry operations is expected shortly when the Tonawanda unit goes down. In addition, production is adversely affected by the poor quality of coke. The local iron market is tighter now than during the war. Operations remain at 94 per cent of capacity with 15 out of 16 stacks in action.

Cincinnati — Lagging deliveries of pig iron added to the problems of district foundrymen who have been operating from hand to mouth. Furnace allocations for December are at unchanged levels, total volume being far below needs. Coke supplies are adequate in the face of this iron shortage.

St. Louis — District's pig iron production has remained unchanged since the Koppers Co.'s Alton, Ill., plant became Missouri-Illinois Furnaces Inc. Output has stayed on the 1000-tons a day level for many months, and company officials say the plant's sale will result in no production or distribution policy changes. Allotments to customers continue on a monthly basis. Coke supplies are tighter, although no distress is reported so far. The firm makes 85 per cent of its coke requirements and buys most of the remainder in the local market. Some shipments, however, are coming from points as distant as St. Paul. On the whole, this district suffers less from the coke situation than eastern stacks. Ore stocks are ample until spring and quality is reported good, considerable tonnages coming from the Ozark mines of southern Missouri.

Scrap . . .

Scrap Prices, Page 152

Philadelphia — Scrap market continued in a stalemate here last week, with the major open-hearth grades nominally unchanged. No recent mill buying is reported and brokers are still having to pay about the same prices on such tonnage as is still needed to cover old contracts. Yard dealers claim that unprepared scrap is coming in slowly. The general price tone at the moment, however, appears to be a fine shade easier. Cast grades are strong, with charging box and heavy breakable cast higher at $50 to $51, delivered; unstripped motor blocks, $47.50 to $48; No. 1 wheels, $52 to $53. Malleable, which is perhaps the scarcest item on the list, also is higher at $60 to $62.

New York — Brokers here are offering lower prices on the major open-hearth grades. Offers range from $34 to $37, fob shipping point, on No. 1 and No. 2 heavy melting steel. Top price applies to old orders while the lower is being quoted in an effort to develop tonnage against some of the new mill offers. However, so far little trading has developed at the lower levels. No. 3 bundles are nominally $32 to $35.

Boston — Pending a real test by new buying at $40 Pittsburgh, activity in heavy melting steel scrap is slow. With old and higher priced contracts out of the way, consumers are holding firm for lower prices and some local volume has been down around $32.50 shipping point. In some cases scrap inventories have gone lower due to lack of buying. The price trend is still uncertain and mixed.

Pittsburgh — No large tonnage purchases of heavy melting steel at the $40 level have been reported since cancellation of unshipped tonnage on higher priced orders late last month. Mills were able to augment scrap inventories during November but shipments have declined sharply since and are limited to clearing up relatively small tonnage commitments at the $40 level. Based on recent mill buying offers it would appear steel producers here and in other districts are attempting to establish a voluntary ceiling on heavy melting steel at 100 per cent above peak OPA prices. Similar attempts are being made to establish prices of other grades in line with former OPA differentials. Whether this price line can be held brings forth mixed opinion in the trade, although it is generally agreed that the 100 per cent increase should absorb present increased scrap collection and segregation costs. It is contended that exorbitantly higher prices do not generate any more scrap.

While recent railroad heavy melting steel lists were allocated at normal $1 differential over industrial steelmaking grades, an additional test of steel producers' efforts to reestablish this differential is expected on the B & O and Pennsylvania railroads' lists which close Dec. 8 and 10, respectively.

Reflecting continued scarcity of both pig iron and cast scrap, prices for the latter are very strong with sales of No. 1 cupola reported in the range of $52.50 to $53.50.

Cleveland — The first week of December lived up to predictions that the month would be a quiet one for the scrap market. All old high-priced orders for scrap are reported to have expired, and the big consumers continue to show no inclination to pay more than $39 to $39.50 for No. 1 heavy melting steel originating in Cleveland. With December being a month in which scrap dealers ordinarily prefer to curtail sales for income tax considerations, it is not expected that much dealer scrap will move for the next several weeks. Furthermore, brokers are hesitant to make contracts at the lower prices when they fear they cannot cover those orders except at a loss. Most of the scrap moving now is earmarked material that steel consumers are returning to the mills from which they get their steel supplies. Return of earmarked scrap to steel mills has further dried up the sources of scrap supply for foundries, resulting in a scramble by foundries for scrap. There is speculation as to the neutralizing effect this foundry demand will have on resistance of steel companies to price increases on dealer scrap. In the Valley, a consumer of low phos scrap said it still has $48.50 and $49 contracts out. However, when those contracts expire in about two weeks the company is hopeful of buying at $45-$46.

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Buffalo — Dealers continue to scoff at the mills' stand to hold prices on No. 2 heavy melting and bundles at $39.25 a ton. Dealers report turning down fresh inquiries from mills at the prevailing bid, explaining that scrap is not available in collection channels at comparative prices. With the pig iron shortage becoming more acute, foundries are rushing the cast market. Sales of No. 1 cupola are reported within the range of $48 & $50 a ton, but supplies are limited. Dealers are experiencing difficulty covering sales. The last boat scrap from the upper lakes, approximately 5000 tons aboard the *Venus,* arrived during the week.

Cincinnati — Tonnage buying of steelmaking scrap at the announced bids is absent here. Brokers are still engaged in completing deliveries against higher priced orders, some of which were canceled while some were extended into December. Hence, little tonnage has been available for any possible deals at the lower price.

St. Louis — Scrap prices eased upward here last week, following expiration of most orders Nov. 22. Rumors are current that sharp increases are pending. Shipments have increased since that date, although Birmingham is reportedly outbidding this market on considerable tonnage in the Southwest. All mills are back in the market but are moving cautiously. Melters complain orders are only accepted on a day-to-day basis and usually involve small tonnages.

Warehouse . . .

Warehouse Prices, Page 149

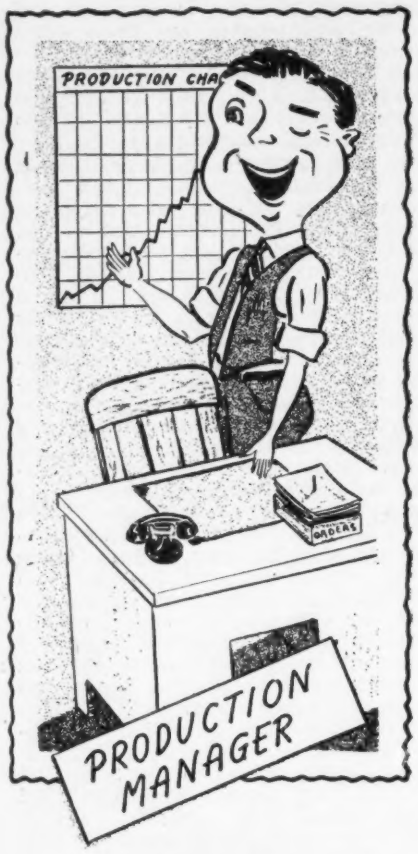
Pittsburgh — Steel distributors have raised base prices and extras on hot-rolled and cold-finished alloy bars. The base price for hot-rolled alloy bars, 4140 series, is now $6.85 per 100 pounds for as rolled; $8.35 for annealed and $10.35 for heat treated quality. Some of the upward revisions in size extras for the 4140 rounds as rolled, are as follows: 5/16-inch, from $1.60 to $2.50; 1 1/2-inch, 45 to 80 cents; 2 to 2 1/2-inch inclusive, 40 to 70 cents; 2 5/8 to 3-inch inclusive, from 45 to 80 cents.

The base price for cold-finished alloy bars has been raised 25 cents per 100 pounds to $9.65 for the 4140 annealed rounds, and $12.50 for heat treated. Some of the new size extras for cold-finished alloy rounds follow: 1/2-inch, from $1.40 to $2.10; 13/16 to 1 7/16-inch, 85 cents to $1.20; 1 1/2 to 2 7/16-inch, 80 cents to $1.15; and 2 1/2 to 3-inch, from 90 cents to $1.25.

Boston — Hot-rolled flat products continue to be the critical spots in warehouse inventories. With first quarter mill allocations reduced because of carryovers, no improvement is likely in the near future. Only on alloys, cold-finished, stainless and a few other items, including tool steel, are distributors supplied for demand which holds high. Plates and structurals are also short, especially in smaller sizes, including bar angles and flats.

Philadelphia — Jobbers here look for a decline in inquiry this month to develop as a result of yearend holidays and inventory-taking. However, business has been brisk so far and may continue with little decline

PORTRAIT OF A



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in demand for flat-rolled products, plates and small shapes. Advances in mill extras on alloys have resulted in generally higher alloy steel warehouse prices. Hot-rolled alloy bars, 4140, are now quoted 7.15c per pound in lots of 1000 to 1999 pounds for city delivery.

Cincinnati — Warehouse steel deliveries sagged during November, due partly to a truckers' strike. The current month will show somewhat better tonnage, but there has been no improvement in mill shipments.

St. Louis — Warehouse steel inventories are deteriorating in the face of the heaviest demand in history. There are no signs of the usual December seasonal decline. On the contrary, manufacturers of nonessential end products are scrambling for more items due to the threat of federal controls. Warehousemen here predict 1947 business will be 5 to 10 per cent less tonnage than in 1946, although the dollar volume will rise.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 148

Youngstown, O. — The current coke shortage is rapidly becoming one of the steel industry's most serious problems, especially in the Youngstown district.

Sharon Steel Corp. is reported losing 20 per cent of its potential blast furnace production by using all beehive coke; other companies, using a percentage of beehive, report they are running eight to 10 per cent under potential iron production as a result.

The coke shortage has brought some unusual deals. One Pittsburgh company is furnishing a considerable tonnage of coke monthly to a Youngstown steel company, which in turn sells some ingots to a third company. The third company rolls it into skelp for a fourth concern which makes it into pipe for another operation of the first company.

Philadelphia — Foundry oven coke supply locally is being affected by resumption of operations at the larger furnace at Swedeland, Pa., and by sharp reduction in shipments by another district coke producer so that more tonnage may go into the production of water gas. Thus, it behooves district consumers to conserve current inventories which generally are in fairly good shape.

Iron Ore . . .

Iron Ore Prices, Page 148

Cleveland — Consumption of Lake Superior iron ore increased in October to 7,150,860 tons from 6,491,937 tons in September and 6,625,145 tons in October, 1946, according to the Lake Superior Iron Ore Association, this city. Furnaces in the United States used 6,939,280 tons in October compared with 6,256,391 tons in the preceding month.

The number of furnaces in blast as of Nov. 1 totaled 179, a loss of two for the month, but a gain of nine over the total a year ago. This made 14 furnaces idle as of Nov. 1 compared with 12 as of Oct. 1 and 25 as of Nov. 1, 1946.

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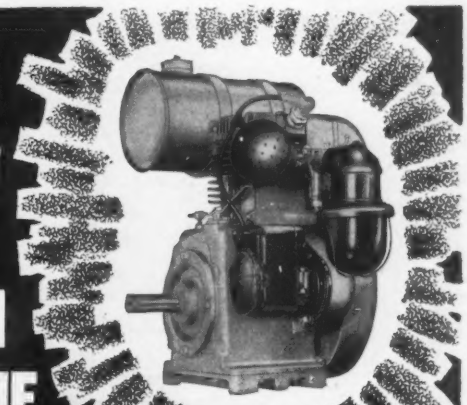

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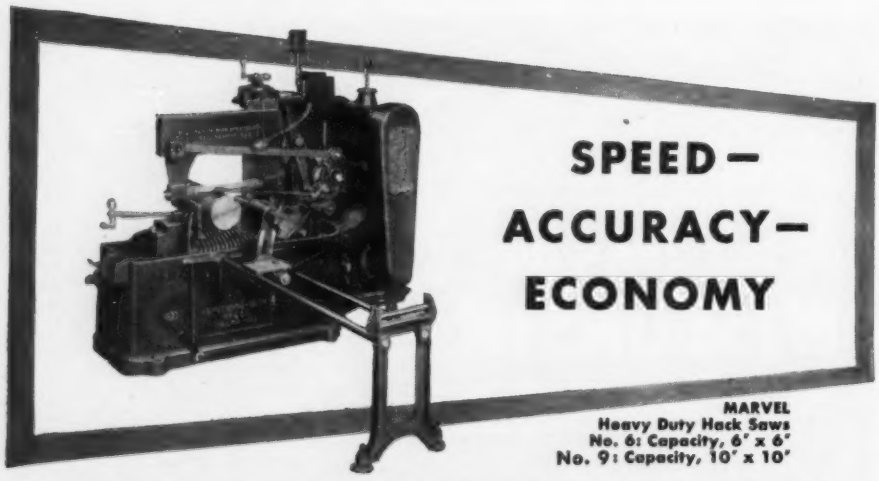

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Birmingham Ingot Capacity Increases 125,000 Tons

Birmingham — New open-hearth furnace of Tennessee Coal, Iron & Railroad Co., at Fairfield Ala., has been placed in production, Robert Gregg, president of the company, has announced. The furnace is listed at 125,000 tons and its addition brings the Birmingham ingot production capacity to approximately 2,750,000 tons annually.

Rails, Cars . . .

Track Material Prices, Page 147

New York — Domestic freight car production in November was 8928 cars, according to the American Railway Car Institute. This figure compares with 8364 in October and marks the sixth consecutive month in which production has been increased and represents a gain of more than 300 per cent from the low output of February.

Canada . . .

Toronto, Ont. — Canada's export trade was valued at $250 million in October, 14.7 pct. over the $218,600,000 reported for September and 22.8 pct. above October, 1946, which totaled $204,200,000. Exports to the United States rose to $102,443,000 in October against $99,086,000 in the same month of 1946, while shipments to empire countries totaled $104,500,000 in the month under review against $71,600,000 in the same month last year.

In the iron and steel group, which rose from $10,658,000 in October, 1946, to $23,352,000 in the same month this year, the largest gains were recorded for farm implements and machinery and other machinery, automobiles and parts.

Foundrymen Discuss Tight Iron Supplies

(*Continued from Page* 61)

probably for some time beyond is not too encouraging, Mr. Claussen said. He commented upon the fact that many furnaces during the war were kept in operation far beyond normal relining schedules. This was also true of coke ovens and other plant facilities. "Now," he said, "we are facing a period of major repairs."

Further, he looked for little relief from abroad. Up to Sept. 1, he pointed out, imports have actually exceeded exports by about 13,000 tons, with exports, incidentally, small and going to countries normally dependent upon the United States for supplies.

A major complication, of course, is the extreme shortage of scrap, which has placed far greater than normal pressure on demand for pig iron. While no important relief is in sight, the programs started by government agencies in July, 1946, are now bearing fruit and the activities of the

Steel Foundry & Scrap Industries Committee for expediting iron and steel scrap should result in increased flow of material from various sources.

New Castings Record — He complimented the gray iron castings industry for being able to achieve a new record annual rate of production of approximately 13,000,000 tons—all in spite of material shortages, labor and other difficulties. He said the merchant pig iron industry is doing what it can to help the foundries and is now closing a year of record production of foundry malleable pig iron for sale at an annual rate equal to about 5,100,000 net tons. This rate, he said, exceeds production of these grades in any year for more than a decade.

In addition to foundries, he pointed out, semi-integrated steel companies also depend upon merchant furnaces for their supplies of pig iron—basic, bessemer and low phosphorus.

Mr. Claussen pointed out that in 1940, the last full prewar year, merchant pig iron produced for sale (foundry and malleable grades) totaled 3,781,635 tons, whereas the production of merchant basic, bessemer and low phosphorus pig iron totaled 2,079,845 tons. The current rate of production of foundry and malleable iron for sale is at a rate of 135 per cent of the 1940 rate, whereas the production of merchant basic, bessemer and low phosphorus is now running at a rate of 2,500,000 tons, or approximately 120 per cent of the 1940 rate. All this, he said, demonstrates that the merchant furnaces are giving every possible consideration to the needs of the malleable and foundry trade.

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1440 tons, addition to Cancer Memorial Hospital, Department of Public Works, New York city, to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons Orlando Utilities, Orlando, Fla., to Southern Steel Works Co., Birmingham. Roberts & Co., Atlanta, engineers.

1000 tons, standard buildings, Luria Engineering Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

870 tons, school No. 20, Queens, New York, to Harris Structural Steel Co., New York, through John T. Brady, general contractor.

860 tons, school No. 3, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

850 tons, school No. 173, Queens, New York, through John T. Brady, general contractor, to Harris Structural Steel Co., New York.

750 tons, pier superstructure, American Sugar Refining Co., Arabi, La., to Bethlehem Steel Co., Bethlehem, Pa.

680 tons, school No. 133, Manhattan, New York, through Carista Construction Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

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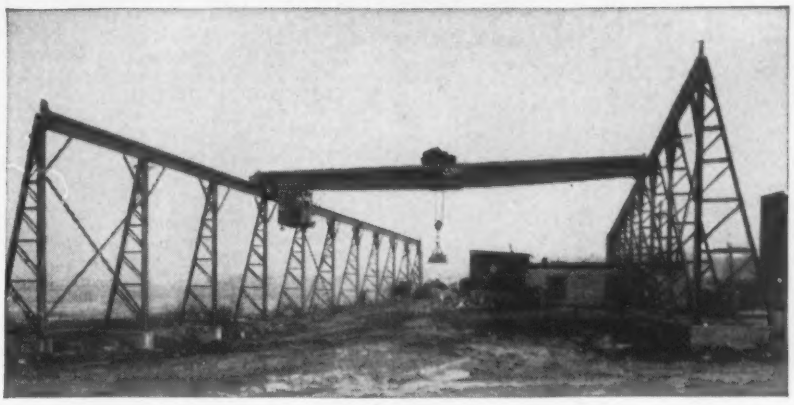

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650 tons, Armour Fertilizer Works, Armour, Fla., to Southern Steel Works Co., Birmingham, through Rust Engineering Co., Pittsburgh.

500 tons, public school, Franklin Square, Long Island, through Lasker-Goldman Corp., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

330 tons, factory building, Mineola, Long Island, to Bethlehem Steel Co., Bethlehem, Pa.

330 tons, factory building, Triangle Conduit & Cable Co., Glendale, W. Va., through Wighton & Abbott, Plainfield, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, Garden apartments, Great Neck, Long Island, to Schacht Steel Construction Inc., New York.

275 tons, school, No. 133, Queens, New York, through T. G. K. Construction Co., to Grant Iron Works, that city.

255 tons, overpass, route 28, section 23, for state of New Jersey, through Ell-Dorer Contracting Co., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, warehouse, William P. Laytham Sons Co. Inc., Paterson, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, Aeroil factory building, South Hackensack, N. J., through C. A. Hunt, Teaneck, N. J., engineering contractor, to Deleson Steel Co., Englewood, N. J.

245 tons, New Jersey state bridge, route 3, section 2B, to American Bridge Co., Pittsburgh.

240 tons, factory addition, Milford, Conn., to Belmont Iron Works, Eddystone, Pa.; Leo F. Caproni, New Haven, engineer.

225 tons, school No. 41, Brooklyn, to Schacht Steel Construction Inc., New York.

200 tons, warehouse, Hanover Steel Corp., Union, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, apartment, West End Ave., New York, to Schacht Steel Construction Inc., that city.

160 tons, storage building, Camp Smith, New York, through F. D. Rich, to Portchester Iron Works, Portchester, N. Y.

100 tons, various contracts, to Standard Steel Fabricating Co., Seattle.

STRUCTURAL STEEL PENDING

800 tons, 19-story apartment for Louis Cowan, 43 Park Ave., New York, bids asked.

750 tons, addition, St. Vincents Hospital, Manhattan, New York, bids asked.

670 tons, furnishing structural steel, 16 bridges, state of Maine, direct bids for material, State Highway Commission, Augusta, Dec. 17.

535 tons or more, six highway spans; bids to State Highway commission, Helena, Montana, Dec. 10.

450 tons, state bridges and approaches in Camden county, New Jersey, bids Dec. 23; also 100 tons reinforcing bars.

300 tons, steel sheet piling, U. S. engineer, Duluth, Minn.; bids in.

250 tons, West Branch bridge, township 3, Indian Purchase, Me., bids on furnishing and erecting, state highway commission, Augusta, Dec. 17; also 56 tons Olson bridge, Lincoln Plantation, Me.

240 tons, relocation U. S. highway 271, Wister Dam, Oklahoma; bids Dec. 19, U. S. engineer, Tulsa.

135 tons, Iron bridge, Auburn, Me., bids on furnishing and erecting, state highway commission, Augusta, Dec. 17.

110 tons, bridge, Connecticut river flood control project, Thetford, Vt.; bids U. S. engineer, Boston, Jan. 7.

100 tons, including reinforcing, Public Roads Administration highway span, Clark county, Washington; Lundmark Bros., Cutler City, Oreg., low $34,096.

Unstated, material for substation bus structures; bids in at Tacoma, Wash.

Unstated tonnage, building, Ridgewood Savings Bank, Laurelton, Long Island, bids asked.

REINFORCING BARS . . .

REINFORCING BARS PENDING

2900 tons, spillway, Whitney dam and reservoir, Texas; bids Jan. 5, U. S. engineer, Galveston; work also takes 480 tons, structural steel.

1225 tons, flood protection works, section B, Louisville, Ky.; bids Jan. 7, U. S. engineer, Louisville.

1000 tons plus for Columbia Basin projects; all bids rejected by Bureau of Reclamation, Denver; new invitation expected; Bethlehem Pacific Coast Steel Corp.; San Francisco, sole complete bid, $103,338; partial bid by Judson Pacific Murphy Co., Emeryville, Cal.

300 tons, arts building, University of Washington, Seattle; bids in.

150 tons, six highway bridges Montana state; bids to Commission, Helena, Dec. 10.

150 tons, Washington state highway bridge; bids in at Olympia.

100 tons, state bridge work and approaches, Camden county, New Jersey, bids Dec. 23; 450 tons of structural steel also is required.

PLATES . . .

PLATES PLACED

2300 tons, 5000-cubic foot gas holder, Long Island Lighting Co., Long Island, to Stacy Bros. Gas Construction Co., Cincinnati.

1800 tons, tanks, Royal Petroleum Co., Sewaren, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

560 tons, tanks, Buckley Development Co., Bridgeport, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

Unstated tonnage, steel vacuum sphere, Bureau of Yards and Docks, Navy, Carderock, Md., Pittsburgh-Des Moines Steel Co., low, $30,970.

Unstated tonnage, 300,000-gallon elevated steel water tank, veterans' hospital, Wilkes-Barre, Pa.

PIPE . . .

CAST IRON PIPE PENDING

Unstated, 5200 feet 8 and 6 inch cast iron pipe, bell and spigot; bids in at Lewiston, Idaho.

Unstated, 12,670 feet, 8 and 4 inch and fittings, alternate steel pipe; bids to Alderwood water district, R. E. Wolff, Seattle engineer; bids Dec. 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National Railways, two 4500-horsepower diesel-electric locomotives, to Electro-Motive Division, General Motors Corp., La-Grange, Ill.

Reading, six 6000-horsepower diesel-electric freight locomotives, three going to the American Locomotive Co., New York, and three to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Chesapeake & Ohio, 200 auto cars, to Pressed Steel Car Co., Pittsburgh.

Lake Superior & Ishpeming, 200 seventy-ton ore cars, to Bethlehem Steel Co., Bethlehem, Pa.

RAILROAD CARS PENDING

New York, Chicago & St. Louis, 400 seventy-ton gondolas, bids asked.

RAILS PLACED

Louisville & Nashville, 55,000 tons of 132 pound rail, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

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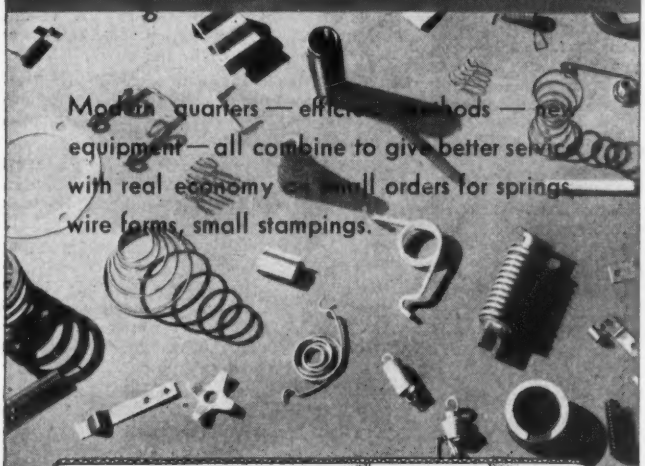

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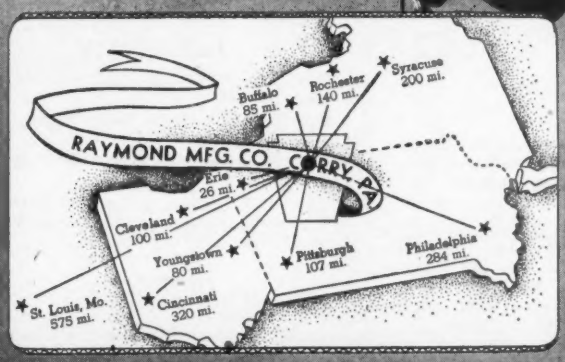

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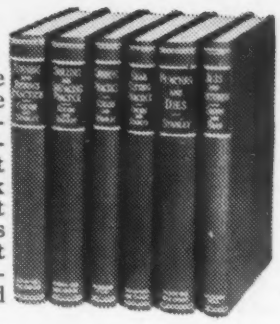

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CALIFORNIA

BURBANK, CALIF.—Cinecolor Corp., 2800 W. Olive Ave., plans to build a $100,000 office building and projection room.

LOS ANGELES—Swing Spout Corp., 3071 E. 12th St., has awarded a contract to Buttress & McClellan, 1013 E. Eighth St., for construction of a $130,000 factory at 1538 Esperanza St.

VERNON, CALIF.—Bethlehem Pacific Coast Steel Corp., 3391 E. Randolph St., has started construction on its $2 million wire mill, to be ready by mid-1948 as part of a $14 million expansion program. New 50-ton electric furnace, to double plant's output, is near completion.

COLORADO

DENVER—A. B. Hirschfeld Press, 1840 California Ave., has awarded a $500,000 contract to Platt-Rogers Inc., 944 Osage St., for construction of a printing and lithographing building near Speer Blvd. and Broadway.

CONNECTICUT

BRIDGEPORT, CONN.—Sikorsky Division, United Aircraft Co., South Ave., will build a $250,000 assembly-flight building. Engineer is Albert Kahn Associated Architects & Engineers Inc., 345 New Center Bldg., Detroit.

DANBURY, CONN.—Sperry Products Inc., J. B. Farwell, president, Hoboken, N. J., has awarded a $1 million contract to Bernard J. Dolan, 207 Greenwood Ave., Bethel, for construction of a factory on Shelter Rock Rd.

FAIRFIELD, CONN.—Riverside Mfg. Co., 151 Court St., New Haven, will build a 2-story, $65,000 factory here at Bird and Osborne Sts. Architect is George Kingston, 25 Court St., Bridgeport.

IDAHO

BOISE, IDAHO—Union Pacific Railway, W. C. Perkins, chief engineer, 1416 Dodge St., Omaha, Neb., has awarded a $221,000 contract to J. O. Jordan & Son, 406 S. Sixth St., for construction of a warehouse and office.

INDIANA

FT. WAYNE, IND.—U. S. Rubber Co. plans a $175,000 plant project to include three building additions. Consulting engineer is J. Gordon Turnbull, 2630 Chester St., Cleveland.

INDIANAPOLIS—Kaiser-Frazer Corp., Willow Run, Mich., has awarded a $600,000 contract to H. D. Tousley Co., 552 Massachusetts Ave., for construction of a steel mill addition.

MICHIGAN

DETROIT—Grand Trunk Western Railroad, H. W. Flemming, chief engineer, 441 E. Jefferson St., plans a $75,000 service building at its East Yard.

NEW YORK

MASPETH, N. Y.—Circle Wire & Cable Corp., Maspeth Ave. and Rust St., has awarded a $420,000 contract to H. Rosen, Long Island City, for construction of a factory.

MASPETH, N. Y.—Frank Tusselino, c/o A. M. De Rose, 370 E. 149th St., New York, has awarded separate contracts totaling $65,000 for construction of a factory at Metropolitan Ave. and 48th St.

NEW YORK—Home Gas Co., Manufacturers Light & Heat Co. and Cumberland & Allegheny Gas Co. have filed joint application with the FPC to construct and operate natural gas transmission facilities costing $2,690,000 in New York, Pennsylvania, West Virginia and Maryland.

PORT JEFFERSON, N. Y.—Long Island Lighting Co., 250 Old County Rd., Mineola, has awarded a contract for erection of a $3,875,000 generating station to O'Driscoll Construction Co., 347 Madison Ave., New York.

OHIO

ASHTABULA, O.—Cleveland Electric Illuminating Co., Public Square, Cleveland, will build a 13,000 volt switch house addition at a cost of $2 million.

ASHTABULA, O.—Electro Metallurgical Co. has awarded separate contracts totaling $1 million for a power plant here. Engineers are Bacon & Davis, 39 Broadway, New York.

BRILLIANT, O.—Ohio Power Co., A. C. Martin, division manager, will build a steam electric generating plant near here. Project is part of a $70 million expansion program.

CLEVELAND—Glidden Co. has a $1 million modernization program in progress at four of its major paint and varnish plants.

CLEVELAND—City is contemplating spending $10 million on expansion of the municipal light plant's generating station at E. 49th St. and Lake Shore Dr.

CLEVELAND—Baltimore & Ohio Railroad, Terminal Tower, will spend $250 million for major improvements and new equipment during the next five to ten years.

CLEVELAND—Eaton Mfg. Co., 739 E. 140th St., has awarded a contract to E. J. Benes Co., Terminal Tower, for construction of a $200,000 addition to its axle plant.

CLEVELAND—Precision Castings Co., 12600 Berea Rd., will build a $150,000 addition to its die shop and office building. Engineer is Edward G. Hoefler, 5005 Euclid Ave.

WARREN, O.—Wean Engineering Co., 347 N. Park Ave., has received a sub-contract from United Engineering & Foundry Co., Youngstown, to build part of the equipment called for in the $20 million order booked by United for rolling mill equipment to be used in a new steel plant in Wales.

YOUNGSTOWN—Aetna-Standard Engineering Co. has received an order for a buttweld pipe mill from Wheeling Steel Corp., Wheeling, W. Va.

OKLAHOMA

MAYSVILLE, OKLA.—J. E. Crosbie Inc., Warren Oil Co. and Carter Oil Co., National Bank of Tulsa Bldg., Tulsa, and Cities Service Co., 1707 E. Sixth St., Tulsa, will build a $6 million gasoline absorption plant.

PONCA CITY, OKLA.—Continental Oil Co. will spend $200,000 on gasoline refinery improvements and expansion.

OREGON

PORTLAND, OREG. — General Electric Co. plans to build a $250,000 warehouse and service shop at N.W. Reed and 21st Sts.

PENNSYLVANIA

BRACKENRIDGE, PA. — Allegheny Ludlum Steel Corp. is calling upon its stockholders for permission to raise $10 million through issuance of preferred stock in anticipation of an additional $15 million that the corporation plans to spend on plant improvements in the next four years.

PHILADELPHIA—Joseph T. Ryerson & Son Inc., 5200 Grays Ave., has awarded a $135,000 contract to John S. McQuade Jr., 1322 Parrish St., for construction of boiler house and warehouse additions.

RHODE ISLAND

PROVIDENCE, R. I.—Narragansett Electric Co., 49 Westminster St., has awarded a $427,000 contract to United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, for erection of an 8-story plant.

TENNESSEE

CHATTANOOGA, TENN.—Tennessee Products & Chemical Corp., Alton Park, will build a $500,000 chemical plant expansion.

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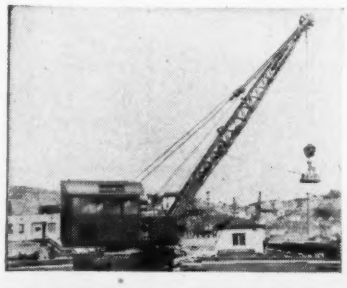

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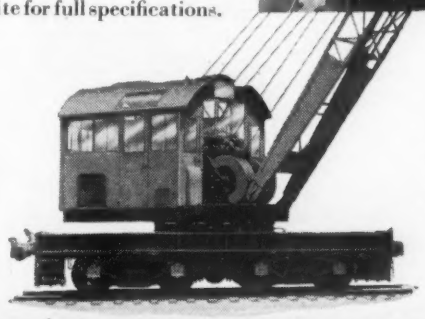

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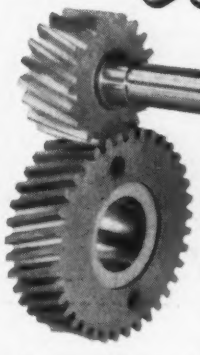

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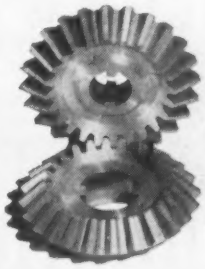

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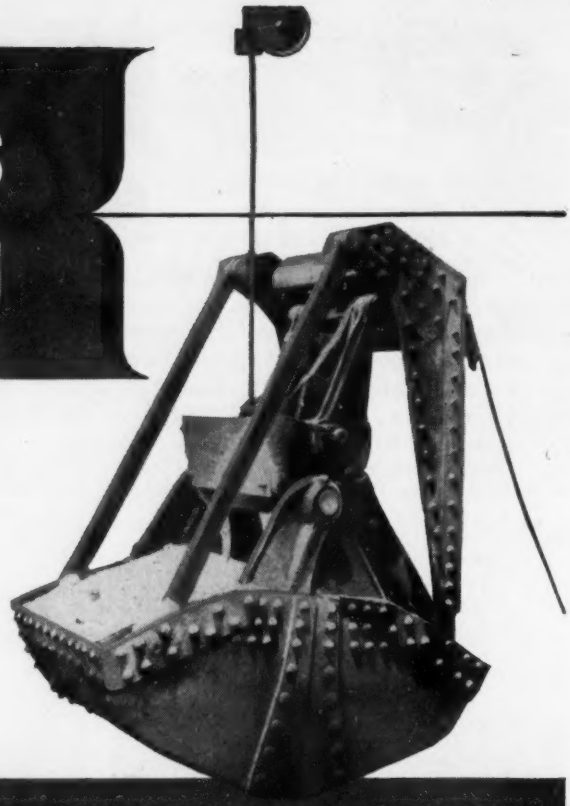

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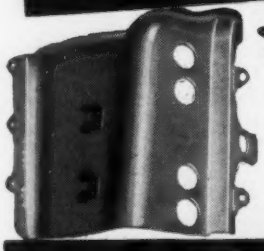

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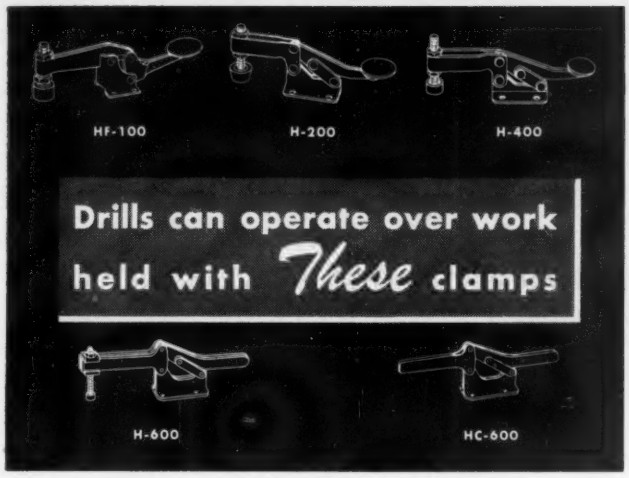

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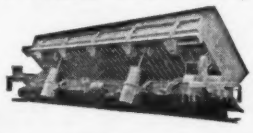

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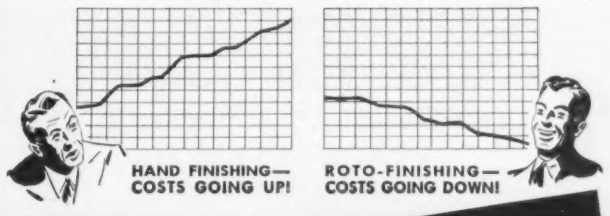

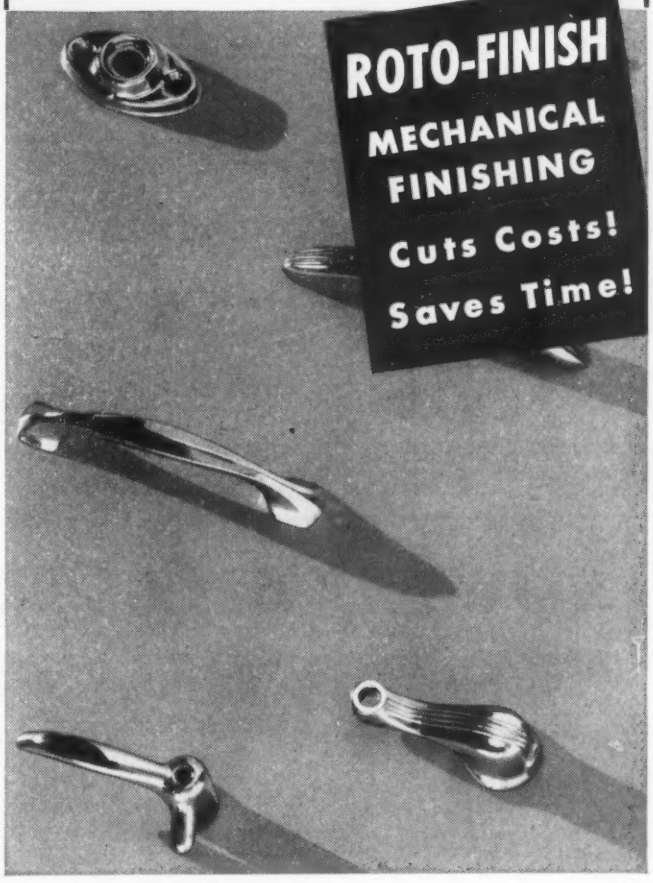

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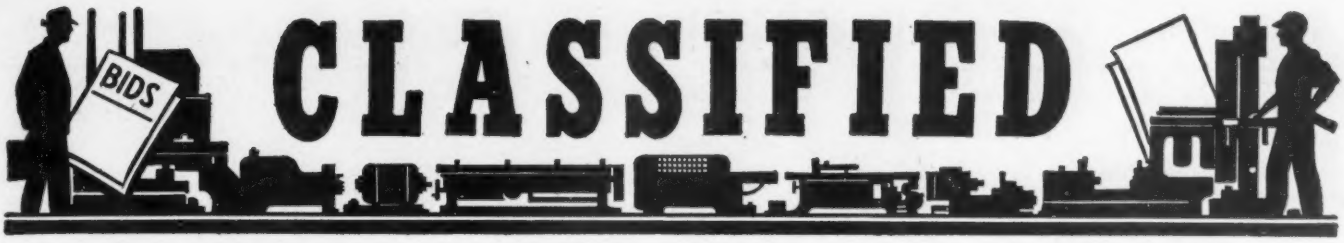

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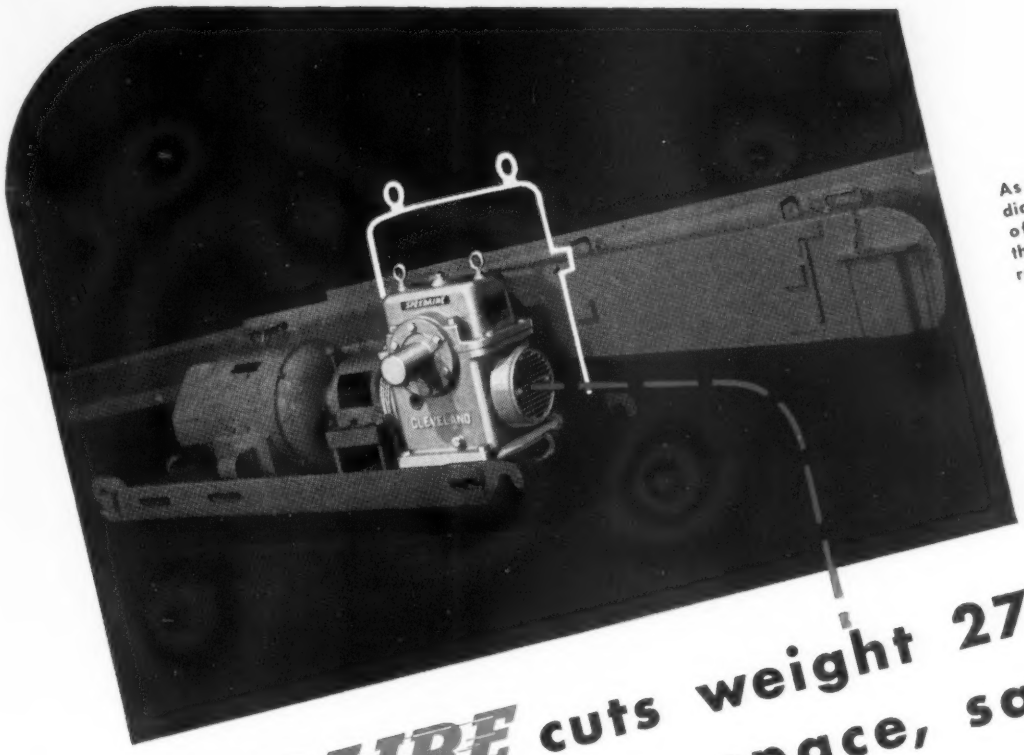

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SPEEDAIRE enabled the builder of this portable mine conveyor to materially reduce the dead weight of his equipment. The speed reducer itself weighs 275 pounds less than a conventional worm gear unit of equivalent capacity. And because Speedaire occupies 53% less space, a further substantial reduction was effected in the size and weight of the base on which motor, drive and conveyor are mounted. An initial cost saving of $130 also was realized with Speedaire.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

Send for Catalog 300 for a full description. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

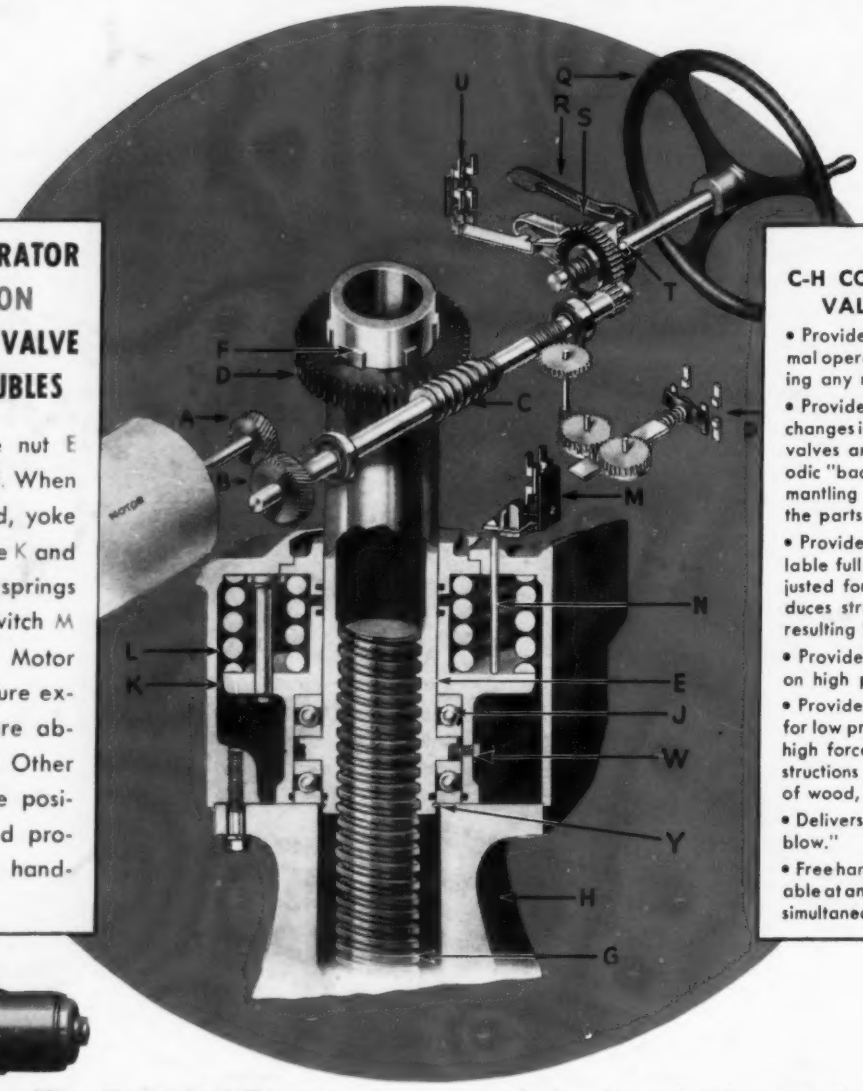
BETTER SEATING ARRANGEMENTS

FOR ALL VALVES

OR . . . HOW TO GET TIGHT SEATING WITHOUT JAMMING

THE VALVE OPERATOR CONSTRUCTION THAT PREVENTS VALVE JAMMING TROUBLES

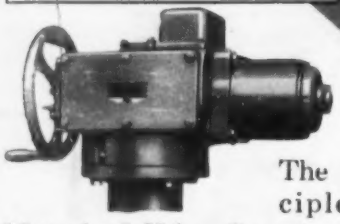
Motor drives yoke nut E thru A, B, C, D and F. When valve disc is seated, yoke nut rises, lifting plate K and rod N, compressing springs L and operating switch M which stops motor. Motor drift, and temperature expansion of stem, are absorbed in springs. Other elements shown are position limit switch and provision for optional hand-wheel operation.



Features of

C-H CONTROLLED THRUST VALVE OPERATORS

- Provides tight closure under normal operating conditions, eliminating any need for "final" seating.
- Provides for large temperature changes in high temperature steam valves and gas valves. No periodic "back off" necessary. No dismantling of valve to "unfreeze" the parts.
- Provides for accurately controllable full power drive, easily adjusted for service conditions. Reduces strain and wear and tear resulting from other systems.
- Provides high speed operation on high pressure valves as well.
- Provides ADEQUATE Protection for low pressure valves . . . against high forces, against artificial obstructions such as gravel, a piece of wood, etc., in the valve.
- Delivers an unseating "hammer blow."
- Free hand-wheel operation available at any time. Protected against simultaneous electrical operation.



The Controlled Thrust principle of Cutler-Hammer Motorized Valve Operators for all kinds of valves provides the following advantages:

It *always* assures a tightly seated valve regardless of the frictional condition of the valve stem or the driving mechanism.

It *definitely* prevents damage to a valve from the expansion and contraction of valve parts under extremes of temperature.

It *unfailingly* provides correct seating no matter how swiftly the valve is closed.

On water lines, it prevents damage in case foreign matter such as gravel lodges in the valve.

Cutler-Hammer *Controlled Thrust* Valve Operators gain their superiority through what may be called a transferable fulcrum. They drive through a yoke nut fulcrum established by heavy steel springs whose compression is equal to the desired tight seating pressure. When the valve is accurately seated, the *seat* becomes the fulcrum, the yoke nut retracts, opening the motor circuit, and motor drift is absorbed by the springs. Moreover, the same accurate seating is maintained as valve parts expand and contract.

Now is the time to investigate this proven superior motorized valve operator for your plant. Available as standard equipment on all leading makes of valves. . . . CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

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